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Parental Psychological Well-Being in the Perinatal Period: A Multi-Methods Study on Maternal Adjustment and Paternal Experiences

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Abstract

The perinatal period, encompassing pregnancy and the first months after birth, represents a critical developmental window marked by profound psychological, relational, and contextual transformations. During this time, both mothers and fathers engage in complex processes of emotional reorganization, identity negotiation, and adaptation to new caregiving roles. These processes can be further shaped by medicalized contexts, such as Assisted Reproductive Technologies (ART) and Neonatal Intensive Care Units (NICUs), where technological, institutional, and relational dimensions intersect to influence the lived experience of becoming a parent. Within this framework, the present doctoral thesis investigates parental psychological well-being through a multi-method approach, integrating quantitative and qualitative perspectives to capture both the structural determinants and the subjective meanings of perinatal adjustment.

The first line of research adopts a longitudinal design to examine the trajectories of maternal psychological well-being from late pregnancy to six months after, and to identify individual, relational, and contextual predictors of emotional adjustment across this transition. Particular attention was devoted to the mode of conception—spontaneous versus ART—as a potential contextual moderator of maternal adaptation. The study assessed general and pregnancy-specific anxiety, depressive mood, feelings of loneliness, defensive functioning, and maternal–fetal and postnatal attachment. Overall, mothers reported good adaptation, although a non-negligible subgroup experienced psychological vulnerability during pregnancy and after childbirth. Postpartum data showed an increase in depressive mood, a decrease in anxiety, and stability in loneliness, with ART conception emerging as a specific risk factor for post-partum anxiety. Across groups, psychological and relational factors, such as defense mechanisms, trait anxiety and social support, jointly shaped maternal well-being and attachment across the perinatal transition. The results point to a continuity between prenatal and postnatal functioning,

highlighting how the quality of emotional adjustment during pregnancy can anticipate later patterns of adaptation.

The second line of research focuses on fathers' experiences in Neonatal Intensive Care Units (NICUs), emblematic of highly medicalized perinatal environments where emotional and relational processes are deeply intertwined with institutional and technological dynamics. Through thematic analysis of narrative interviews with fathers of preterm infants hospitalized in NICUs across different levels of care, the study explores how men construct and negotiate their paternal identity within contexts of neonatal fragility and clinical specialization. Three main themes emerged: "Navigating the NICU: Between Uncertainty and Powerlessness," "Relationships in the NICU: Between Care and Connection," and "Fatherhood in the NICU: Negotiating Identity and Role Across narratives". Fathers described the NICU as a liminal space where their sense of fatherhood was marked by feelings of helplessness and emotional distance, which at times coexisted with moments of recognition and inclusion. The analysis highlights how the construction of paternal identity in these medicalized settings is shaped by the interplay between institutional containment and relational inclusion, as well as by the degree of accessibility and participation afforded to fathers.

Taken together, the two studies offer complementary insights into maternal and paternal adaptation in medicalized perinatal contexts. By integrating quantitative and qualitative evidence, the dissertation proposes a multidimensional model of parental well-being that encompasses both vulnerability and resilience, grounded in the dynamic interaction between personal resources, relational networks, and contextual frameworks of care. The results advocate for family-centered and developmentally informed models of perinatal care, attentive to the specific needs and strengths of both mothers and fathers across diverse clinical settings, and for the implementation of psychological monitoring and support from pregnancy throughout the entire perinatal period.

Keywords: Perinatal well-being; Fatherhood in NICU; Maternal adjustment; Assisted Reproductive Technologies (ART); Family-centered care.

1. General Introduction

The perinatal period, encompassing pregnancy and the first year after birth, constitutes a critical developmental window for both parental psychological well-being and infant health. It is increasingly recognized as a period of heightened vulnerability and opportunity, during which biological, psychological, relational, and environmental factors converge to shape the trajectories of parental adaptation and child development (Howard & Khalifeh, 2020). Becoming a parent is not a single event but a complex, progressive process involving profound changes in identity, relationships, roles, and expectations. The imagined and desired child rarely coincides entirely with the real child who arrives, and the transition to parenthood frequently mobilizes intense emotional states, unconscious representations, and culturally mediated meanings. The parent–infant bond, far from being innate or automatic, is gradually co-constructed through processes of reciprocal attunement, caregiving, and shared experience, and is therefore deeply sensitive to contextual influences—including medicalization, social support, and institutional settings (Tambelli, Trentini, & Cerniglia, 2025; Weis & Lederman, 2021).

From a developmental perspective, the first 1,000 days of life represent a period of rapid neurobiological growth and relational formation that lays the foundation for lifelong mental health and well-being (Aguayo & Britto, 2024). Maternal emotional states during pregnancy, such as anxiety, stress, and depression, can shape fetal development through hormonal and neurobiological pathways, while early caregiving relationships support the emergence of socioemotional regulation and attachment security (Aguayo & Britto, 2024; Howard & Khalifeh, 2020). Psychological distress in the perinatal period is associated with impaired bonding, reduced parental sensitivity, and increased risk for emotional, behavioral, and cognitive difficulties in children—effects that can persist throughout development (Henrichs et al., 2023; Rusanen et al., 2024). These risks extend beyond individual families, contributing to

the population burden of mental health difficulties across the lifespan (Howard & Khalifeh, 2020).

Recognizing this, the World Health Organization has identified perinatal mental health as a global public health priority, emphasizing that psychological well-being is an integral component of parental, neonatal, and child health (Le Lez et al., 2025). Perinatal mental health disorders are among the most common complications of pregnancy and the postpartum period: perinatal depression affects 10–28% of mothers worldwide (Al-Abri et al., 2023), while anxiety symptoms occur in 15–25% of cases (Dennis et al., 2018; Araji et al., 2020); paternal depressive and anxiety symptoms are also increasingly documented, affecting up to 13% of fathers (Watkins et al., 2024). These conditions frequently begin during pregnancy, underscoring the importance of early, universal monitoring and preventive interventions that extend across the entire perinatal window (Ayers et al., 2024; Al-Abri et al., 2023). The WHO's multidimensional framework of parental well-being further highlights the role of physical and mental health, relational connectedness, quality of care, safety, autonomy, resilience, and cultural values, calling for a shift from a pathology-focused to a resource- and context-oriented approach (Le Lez et al., 2025).

Perinatal adaptation is shaped by a dynamic interplay of risk and protective factors, including previous mental health difficulties, medical complications, social support, relational quality, and coping strategies (Liu et al., 2022). In recent years, the landscape of reproduction and early parenthood has grown increasingly complex, as medical progress has expanded possibilities but also introduced new forms of emotional and relational complexity, with two scenarios particularly emblematic of this transformation. The first concerns medically assisted reproduction (ART), which now accounts for more than 10 million births worldwide (ESHRE, 2019; Sunderam et al., 2022). ART pregnancies are often preceded by long and emotionally intense experiences of infertility and are embedded in medicalized care pathways. These

circumstances can increase vulnerability through heightened expectations and fear of loss, but can also enhance preparedness, resilience, and parental investment (Ranjbar et al., 2020; Galbally et al., 2024; Ribeiro Neto et al., 2025). Understanding how these factors influence maternal well-being is crucial for designing interventions that support mothers not only after birth but throughout the entire perinatal trajectory (Gourounti, 2016; Grønlund et al., 2025).

The second scenario concerns prematurity and neonatal intensive care. Preterm birth, affecting over one in ten births worldwide, often entails hospitalization in Neonatal Intensive Care Units (NICUs)—highly medicalized settings where the ordinary rituals of bonding and caregiving are profoundly disrupted (Darmstadt, Marchant, & Kramer, 2023; van Wyk et al., 2024). In these contexts, parents are confronted with uncertainty, technological mediation, and institutional constraints that challenge both emotional regulation and the consolidation of parental identity (Stefana et al., 2024; Schwartz et al., 2025). Historically, research and practice have focused primarily on mothers, relegating fathers to peripheral roles (Provenzi & Santoro, 2015; Watkins et al., 2024). However, growing evidence underscores that paternal psychological well-being plays a crucial role in family functioning and child outcomes (Aljawad et al., 2024; Tiryaki, Çınar, & Caner, 2024). Fathers of preterm infants frequently experience high levels of distress, often compounded by cultural, structural and organizational barriers that limit their involvement in caregiving (Hassan et al., 2025; Adama et al., 2025). Conversely, inclusive and family-centered care models have shown that paternal participation can foster bonding, support maternal well-being, and promote infant development (Aljawad et al., 2024; Tiryaki, Çınar, & Caner, 2024).

These two contexts—ART and NICUs—are emblematic of the broader transformations characterizing the perinatal landscape: increasing medicalization, delayed parenthood, diversification of family trajectories, and growing awareness of the relational and psychological dimensions of early caregiving. Understanding how these factors shape parental experiences is

essential for designing interventions that are developmentally informed, context-sensitive, and family-centered.

The present thesis pursues two main objectives.

First, it examines maternal well-being during the perinatal period, focusing on predictors and trajectories of emotional adjustment from late pregnancy to six months after the initial assessment during the postpartum period. Particular attention is devoted to the mode of conception, natural conception versus ART, to explore how this contextual factor influences maternal psychological experiences and outcomes. Investigating how individual, relational, and situational factors interact in shaping adaptation can inform preventive strategies and tailored interventions.

Second, it explores paternal experiences in NICUs through a qualitative lens, focusing on uncertainty, relational dynamics, and identity construction in medicalized and institutional contexts. By foregrounding fathers' lived experiences, this study aims to give visibility to a dimension long underrepresented in perinatal research and clinical practice.

Taken together, these two lines of inquiry offer perspectives on the psychological landscape of the perinatal period. Quantitative analyses provide population-level insights into maternal trajectories, while qualitative exploration illuminates the subjective meanings and identity processes that shape paternal adjustment in high-intensity clinical settings. By integrating these perspectives, the thesis contributes to a more inclusive and contextually grounded understanding of perinatal mental health. Ultimately, these findings aim to inform clinical practice through family-centered models of care and to support public health strategies that address the psychological needs and contributions of both parents in an era of increasingly complex pathways to parenthood.

2. Maternal Well-being Across the Perinatal Transition: Baseline Findings

2.1. Introduction

Pregnancy represents a critical developmental transition in a woman's life, characterized by profound psychological, physiological, and relational changes. Even when consciously planned and deeply desired, pregnancy can elicit ambivalent emotions, including vulnerability, fear, and uncertainty—particularly among first-time mothers (Lederman & Weis, 2021). These emotional experiences become especially salient in the third trimester, when both physical and psychological changes intensify in preparation for birth.

In recent years, maternal psychological well-being during pregnancy has received increasing scientific attention due to its established impact on maternal functioning, obstetric outcomes, fetal development, and early bonding (Grigoriadis et al., 2018; Howard & Khalifeh, 2020). Mental health difficulties during pregnancy have been associated with a higher risk of preterm birth, low birth weight, obstetric complications, impaired bonding, and long-term emotional and neurodevelopmental difficulties in the offspring (Rogers et al., 2021).

Among the most frequently studied psychological conditions in pregnancy are depressive and anxiety symptoms. Perinatal depression affects between 10% and 28% of women, with a mean prevalence of clinically significant depressive symptoms during pregnancy estimated between 15-20% (Yin et al., 2022; Al-Abri et al., 2023). Anxiety disorders are similarly common, affecting 19.9% of pregnant women overall, with prevalence peaking at 25.5% in the first trimester (Dennis et al., 2018; Araji et al., 2020). Pregnancy-specific anxiety—which encompasses fears about fetal health, labor pain, body changes, and maternal adequacy—ranges from 7.7% to 36.5% (Alzahrani et al., 2023). Notably, the prevalence and severity of perinatal

mental health difficulties are higher in low- and middle-income countries, reflecting greater socioeconomic vulnerability (Yin et al., 2022; Alzahrani et al., 2023).

In parallel, loneliness and perceived social isolation—often overlooked or silenced due to stigma—affect between 32% and 42% of pregnant women and are linked to increased depressive and anxious symptomatology, as well as adverse obstetric and neonatal outcomes (Kent-Marvick et al., 2022; Adlington et al., 2023). Another crucial psychological dimension is prenatal attachment, the emotional bond a mother develops toward her unborn child. Higher levels of prenatal attachment have been associated with greater maternal sensitivity, more positive bonding, and better neonatal outcomes, while lower levels have been linked to maternal distress and early relational difficulties (Rollè et al., 2020; Gioia et al., 2023).

This already complex landscape may be further complicated in women who conceive through Assisted Reproductive Technologies (ART). According to the World Health Organization (2023)**,** 17.5% of the adult population—roughly one in six people worldwide—experience infertility. Globally, over 10 million children have been born via ART, and ART births represent 8% of all children in Europe **(**ESHRE, 2019) and 5% in the United States as of 2019 **(**Sunderam et al., 2022**)**. According to the Italian National Institute of Health (Istituto Superiore di Sanità, 2022), approximately 5% of all births in Italy in 2022 resulted from ART. Although ART offers new paths to parenthood, it often follows emotionally demanding experiences involving infertility, repeated and invasive medical procedures, and uncertainty that may last for months or even years, which can heighten distress and challenge maternal well-being (Ribeiro Neto et al., 2025). However, literature findings remain mixed (Gourounti, 2016; Kumar et al., 2024; Burgio et al., 2022; Si et al., 2024). While some studies report higher levels of psychological symptoms among ART mothers (Kumar et al., 2024; Gourounti, 2016), others report no significant differences—or even lower depressive symptoms—compared to women with spontaneous conception, possibly due to greater resilience, social support, or positive reappraisal (Si et al., 2024; Burgio et al., 2022). Similarly, while some findings highlight

enhanced prenatal bonding in ART pregnancies (Pellerone et al., 2023), others describe difficulties in emotional availability or postnatal interaction (Yoshimasu et al., 2020). These inconsistencies likely reflect methodological heterogeneity (e.g., sample size, timing of assessment, measurement tools).

Regardless of conception type**,** several factors have been linked to increased psychological distress during the pregnancy period, including a history of mental illness, past trauma, stressful life events, low social support, marital conflict, chronic health conditions, medical complications (e.g., preeclampsia or gestational diabetes), and sleep disturbances (Al-abri, 2023; Alzahrani et al., 2023; Soto-Balbuena et al., 2018). In addition to contextual and psychosocial variables, psychological defense mechanisms represent a further dimension of maternal adaptation that remains underexplored in perinatal research (Carone et al., 2025; Porcerelli et al., 2022). These mechanisms may influence how pregnant women regulate distress, mobilize resources, and adjust emotionally to pregnancy and impending motherhood.

Despite the growing body of research, longitudinal studies comparing ART and spontaneous pregnancies, both during pregnancy and postpartum, remain scarce and inconsistent (Grønlund et al., 2025; Simoni et al., 2022; Ranjbar et al., 2022; Galbally et al., 2024). A longitudinal investigation can provide information about emotional stability and time periods of risk among women who conceived either spontaneously or through ART.

In light of these considerations, we conducted a web-based longitudinal survey to explore maternal psychological well-being starting from the third trimester of pregnancy up to 2 years in a sample of first-time mothers attending antenatal classes.

In this contribution, we present baseline findings of the “Maternal wellbeing (Benessere Materno)” project. The first baseline assessment, conducted between september 2024 and september 2025, comparing women who conceived spontaneously and those who conceived through ART. The study evaluates symptoms of depression, general and pregnancy-specific anxiety, loneliness, defense mechanisms, and prenatal attachment aiming to identify

psychosocial risk and protective factors shaping maternal mental health trajectories during this sensitive transition.

Based on previous evidence, we expected to observe comparable levels of mental health across conception groups, with potential differences in contextual risk factors, and hypothesized that defense mechanisms would serve as significant predictors of maternal well-being during pregnancy.

2.2. Methods

2.2.1. Participants and Procedure

The present study is part of the broader "Maternal Well-being (Benessere Materno)" longitudinal project and focuses on the baseline assessment (T0), conducted during the third trimester of pregnancy. The research was carried out in accordance with the ethical standards of the Declaration of Helsinki and received approval from the Ethics Committee of the IRCCS San Raffaele Scientific Institute (protocol no. CET 012-2024). Participants were recruited among women attending the Childbirth Preparation Course (Corso di Accompagnamento alla Nascita) organized by the IRCCS San Raffaele Hospital in Milan. This course is delivered by a multidisciplinary team, primarily composed of psychologists and midwives, and provides both medical and psychosocial support to expectant mothers. The course is open to partners, who are encouraged to attend together with expectant mothers.

The study population included first-time pregnant women who conceived either spontaneously or through assisted reproductive technologies (ART), were at least 18 years old, had sufficient proficiency in Italian, and agreed to participate in follow-up assessments over the 18 months following childbirth. All participants provided informed consent and authorized the anonymous processing of their personal data. Participation was voluntary and involved the completion of a self-administered battery of standardized questionnaires, all validated in the Italian language.

The questionnaires were administered electronically using the Qualtrics platform. A personalized survey link was sent via email by the course psychologists at the beginning of the childbirth preparation course, so that the timing of questionnaire completion corresponded to the period in which participants were actively attending the course.

2.2.2. Measure

Data collection was conducted using a sociodemographic form and a set of standardized and validated self-report questionnaires.

A sociodemographic form was specifically developed to collect information regarding sociodemographic variables (e.g., age, education level, occupation, working after the 20th week of pregnancy), clinical data (e.g., gestational week, mode of conception—natural or through ART—and presence of complications), and anamestic factors (such as history of psychological symptoms and support received from the partner and family).

The State-Trait Anxiety Inventory Form Y (STAI-Y; Spielberger & Sydeman, 1994; Pedrabissi & Santinello, 1989) is a 40-item questionnaire designed to assess general anxiety symptoms. It is divided into two subscales of 20 items each, measuring state (Y1) and trait (Y2) anxiety separately. Items are rated on a 4-point Likert scale (1 = not at all to 4 = very much so), with total scores ranging from 20 to 80 for each scale. Clinically, anxiety is categorized as low (20–39), moderate (40–59), and high (60–80). Internal consistency is high for both scales ($\alpha = 0.86$–0.95 for state; $\alpha = 0.89$–0.91 for trait), with moderate test-retest reliability.

The Pregnancy-Related Anxiety Questionnaire – Revised 2 (PRAQ-R2; (Huizink & Mulder, 2004; Dellagiulia et al., 2019) assesses pregnancy-specific anxiety. The 10 items are rated on a 5-point Likert scale (1 = never true to 5 = very true), yielding total scores between 10 and 50. The questionnaire captures fears about childbirth, fetal health, and changes in body image. Higher scores indicate higher anxiety. Internal consistency is good (Cronbach's $\alpha > 0.80$).

The Edinburgh Postnatal Depression Scale (EPDS; (Cox et al., 1987; Benvenuti et al., 1999) is a 10-item self-report questionnaire used to screen for depression symptoms during the perinatal period. Items are rated on a 4-point scale (0 to 3), assessing the frequency of symptoms experienced over the past week. Total scores range from 0 to 30, with higher scores indicating greater depressive symptomatology. Clinically, depression symptoms are categorized as low (0-9), moderate (9-12) and high (>12) (Palumbo et al., 2016). The EPDS has demonstrated good internal consistency (Cronbach's alpha between .79 and .87) and split-half reliability (> .80).

The UCLA Loneliness Scale (UCLA S; (Boffo et al., 2012; Russell, 1996) is a 20-item self-report questionnaire designed to assess feelings of loneliness. Items are rated on a 4-point Likert scale (from 1 = never to 4 = always), with a total score ranging from 20 to 80. This scale has been widely used in the perinatal period (Kent-Marvick et al., 2022). It shows good psychometric properties, including internal consistency (Cronbach's alpha = .89–.94) and test-retest reliability (r = .73). The Italian version (Boffo et al., 2012) supports a three-factor structure: Isolation (relational dissatisfaction), Relational connectedness (emotional loneliness and unmet attachment needs), and Trait loneliness (personality-based tendencies such as shyness and low extroversion). Clinically, lonliness is categorized as low (20–34), moderate (35–49), moderately high (50–64) and high (65–80) (Russell, 1996).

The REM-71 (Steiner et al., 2001; Prunas et al., 2009) is a 71-item questionnaire designed to assess psychological defense mechanisms. Sixty-six items cover 21 specific defenses, and 5 are neutral or control items. Each item is rated on a 9-point Likert scale (1 = strongly disagree to 9 = strongly agree). Factor analysis revealed two overarching factors: Factor 1 (maladaptive defenses) and Factor 2 (adaptive defenses). Internal consistency is acceptable ($\alpha = 0.84$ for F1; $\alpha = 0.69$ for F2). A cut-off of ≥ 4.40 for F1 suggests increased psychological vulnerability, though its use should be cautious due to potential false positives.

The Maternal Antenatal Attachment Scale (MAAS) (Condon & Corkindale, 1993; Busonera et al., 2016) measures prenatal attachment. The 19 items are rated on a 5-point Likert scale and explore emotional and cognitive engagement with the unborn baby. The scale originally proposed two dimensions (quality and intensity of attachment), though later studies supported a unidimensional model for practical use. Internal consistency ranges from 0.69 to 0.87. Higher scores reflect greater emotional connection and engagement with the fetus.

2.2.3. Statistical Analysis

Categorical variables were described as absolute and relative frequencies. Continuous variables were summarized by median and interquartile range (IQR), as well as by mean and standard deviation (SD).

Differences between women who conceived spontaneously and those who conceived through assisted reproductive techniques (ART) were evaluated using Fisher's exact test for categorical variables and the Mann–Whitney test for numerical variables. Correlations between psychological variables were evaluated using Spearman's rank correlation coefficient.

Finally, multiple linear regression analyses were conducted to identify factors independently associated with the psychological outcomes characterizing maternal emotional well-being. Separate models were estimated for each conception group (spontaneous vs ART), considering sociodemographic, clinical, and psychological characteristics as covariates. In order to meet the assumptions of the model, if necessary an appropriate transformation of the dependent variable was applied and outliers of the model were excluded. A backward variable selection procedure was used to identify the most parsimonious model, starting from an initial set of predictors defined a priori based on theoretical assumptions. For state anxiety (STAI-Y1), depressive symptoms (EPDS), pregnancy-related worries (PRAQ), and loneliness (UCLA), the following variables were initially included: age group (≤35 vs >35 years), employment after 20 weeks, unintentional interruption, pregnancy complications, psychopathological symptoms, current

consultation with a professional, partner support, family support, trait anxiety (STAI-Y2), immature defenses (REM-71 Factor 1), and mature defenses (REM-71 Factor 2). For the maternal–fetal attachment outcomes (MAAS – Quality and Intensity), the same set of predictors was included, adding state anxiety (STAI-Y1), depressive symptoms (EPDS), loneliness (UCLA), and pregnancy-related worries (PRAQ) as additional covariates to account for concurrent psychological states.

A significance level of 5% was defined for all analyses. All statistical analyses were carried out using R software (version 4.4.3).

2.3. Results

2.3.1. Sample characteristics

A total of 297 pregnant women were enrolled during their third trimester of pregnancy (mean gestational week = 31.3, SD = 2.1). The mean age was 35.4 years (SD = 4.4), and 53% were older than 35 years. Most participants were either married (52%) or cohabiting (48%), with a high educational level (72% had at least a university degree) and were employed (88%) (see Appendix A, Table S1 for Sociodemographic and clinical characteristics of all sample).

Seventy-seven women (26%) conceived through assisted reproductive techniques (ART), while 220 (74%) conceived spontaneously. Compared with the spontaneous conception group, the ART group included a higher proportion of women aged >35 years (83% vs 43%; $p < 0.001$), more frequently married (66% vs 46%; $p = 0.006$), and more often employed (96% vs 85%; $p = 0.023$).

The median time spent trying to conceive was 6 months (IQR 1–24), but this value differed markedly by conception mode: women who conceived through assisted reproductive techniques reported a median of 30 months (IQR 24–48), compared to 3 months (IQR 1–6.5) in the spontaneous conception group ($p < 0.001$).

Most participants reported very high levels of perceived support from both partner (84%) and family (73%), while 20% were currently receiving psychological support. Approximately 14% reported pregnancy complications, and 22% had experienced a previous unintentional pregnancy interruption. 78% of women were still working after the 20th week of pregnancy. No significant differences between ART and spontaneous conception groups were observed for these variables (all $p > 0.05$) (see Table S2 for sociodemographic and clinical characteristics stratified by conception mode).

In addition to sociodemographic and clinical characteristics, trait anxiety and defense mechanisms were considered stable individual factors in the statistical analyses.

Mean trait anxiety (STAI-Y2) score was 38.0 (SD = 8.6). Based on established clinical cut-offs, 62% of participants reported low levels of trait anxiety (20–39), 37% reported moderate levels (40–59), and 1.7% were in the high range (60-80) (Spielberger & Sydeman, 1994; Pedrabissi & Santinello, 1989). No significant differences between groups (spontaneous conception: M = 37.6, SD = 8.6; ART group: M = 39.0, SD = 8.4; $p = 0.199$).

Regarding defense mechanisms (REM-71), the mean score for immature defenses (Factor 1) was 3.66 (SD = 0.89) and for mature defenses (Factor 2) 5.48 (SD = 0.85), with no significant group differences (Factor 1: $p = 0.769$; Factor 2: $p = 0.533$) (see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode).

2.3.2. STAI-Y State Anxiety

Regarding anxiety symptoms, mean state anxiety (STAI-Y1) was 38.7 (SD = 8.6). In terms of clinical categories, according to the clinical cut-offs (Spielberger & Sydeman, 1994; Pedrabissi & Santinello, 1989), most participants (59%) reported low anxiety sympotms (20–39), 40% were in the moderate range moderate of state anxiety (40-59), while only 1.3% scored in the high range (60-80). No significant differences between conception groups were observed for

either state or trait anxiety ($p > 0.05$; see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode).

Regarding correlational analyses, across conception groups, state anxiety positively correlated with trait anxiety (STAI-Y2), immature defense mechanisms (REM-71 Factor 1), and negatively correlated with mature defense mechanisms (REM-71 Factor 2) and the intensity subscale of maternal antenatal attchment (MAAS-intensity). Full correlation matrices are provided in Supplementary Tables S4–S5.

In multivariate analyses, family support and trait anxiety emerged as significant predictors of state anxiety in the spontaneous conception group: specifically higher trait anxiety ($\beta = 0.057$, $p < 0.001$) and lower family support ($\beta = -0.284$, $p < 0.001$) were independently associated with higher state anxiety (see T1). In the ART group, trait anxiety remained the only significant predictor ($\beta = 0.062$, $p < 0.001$) (see Table T2).

Table T1. Final model for STAI state anxiety in Spontaneous conception group (square-root transformed)

	Estimate	Std. Error	p-value
Intercept	4.2162	0.1536	<0.0001
Family support = Very much / Extremely	-0.2835	0.0649	<0.0001
STAI – Trait anxiety	0.0569	0.0034	<0.0001

Table T2. Final model for STAI state anxiety in ART group (square-root transformed)

Variable	Estimate	Std. Error	p-value
Intercept	3.8946	0.2110	<0.0001
STAI – Trait anxiety	0.0618	0.0053	<0.0001

2.3.3. PRAQ Pregnancy-related anxiety

Mean PRAQ total score was 25.9 (SD = 7.1), below the exploratory threshold of 30 used to indicate elevated pregnancy-related anxiety (Hadfield et al., 2022). No significant differences between ART and spontaneous conception groups were observed for the total score or for any

of the subscales ($p > 0.05$, see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode).

Regarding correlational analyses, in the ART group the total score of the questionnaire was positively correlated with trait anxiety (STAI-Y2) and immature defense mechanisms (REM-71 Factor 1), and negatively correlated with mature defense mechanisms (REM-71 Factor 2). Moreover, in the spontaneous conception group, it was also correlated with maternal antenatal attachment (MAAS) (see Tables S4–S5 for full correlation matrices).

In multivariate analyses, PRAQ – Worries about disabled child subscale was significantly predicted by working after the 20th week of pregnancy ($\beta = 0.223$, $p = 0.018$), previous psychopathological symptoms ($\beta = 0.203$, $p = 0.016$), trait anxiety (STAI-Y2; $\beta = 0.016$, $p = 0.004$), and immature defenses (REM-71 Factor; $\beta = 0.170$, $p = 0.001$) in the spontaneous conception group (see Table T3).

Table 3. Final model for PRAQ Worries Disabled Child in Spontaneous conception group (square-root transformed)

	Estimate	Std. Error	p-value
Intercept	1.5589	0.2274	<0.0001
Working after the 20th week of pregnancy	0.2228	0.0934	0.0180
Psychopathological symptoms	0.2025	0.0832	0.0159
STAI – Trait anxiety	0.0156	0.0053	0.0039
REM-71 Factor 1 – Immature defenses	0.1695	0.0482	0.0005

In the ART group, the same outcome was significantly predicted by pregnancy complications ($\beta = 0.334$, $p = 0.039$), not currently consulting a professional ($\beta = -0.446$, $p = 0.002$), higher immature defenses (REM-71 Factor 1; $\beta = 0.298$, $p < 0.001$), and lower mature defenses (REM-71 Factor 2; $\beta = -0.213$, $p = 0.006$) (see Tables T4).

Table 4. Final model for PRAQ Worries Disabled Child in ART group (square-root transformed)

Variable	Estimate	Std. Error	p-value
Intercept	3.2136	0.4578	<0.0001
Pregnancy complications	0.3341	0.1580	0.0387
Currently consulting a professional	-0.4464	0.1364	0.0018
REM-71 Factor 1 – Immature defenses	0.2978	0.0685	<0.0001
REM-71 Factor 2 – Mature defenses	-0.2126	0.0741	0.0057

2.3.4. EPDS Depressive symptoms

Mean depressive symptoms score (EPDS) was 8.1 (SD = 4.7). Based on clinical cut-offs, 66% of partecipants reported low depressive symptoms (0-9), 17% fell within the moderate range (9-12), and 18% scored in the high rang (>12) (Cox et al., 1987; Benvenuti et al., 1999). No statistically significant difference was found between groups, although a trend toward higher depressive symptoms in the ART group was observed ($p > 0.087$; see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode)

Regarding correlational analyses, in both cocenption group depressive symptoms positively correlated with trait anxiety (STAI Y2), immature defensed mechanisms (REM-71 Factor 1) and antenatal attachment (MAAS). Full correlation matrices are provided in Supplementary Tables S4–S5.

In multivariate analyses, partner support**,** trait anxiety, and immature defense mechanisms (REM-71 Factor 1) emerged as significant predictors of depressive symptoms in the spontaneous conception group: lower partner support ($\beta = -0.416$, $p = 0.0016$), higher trait anxiety ($\beta = 0.0538$, $p < 0.0001$), and higher immature defenses ($\beta = 0.1761$, $p = 0.0020$) were independently associated with higher EPDS scores (see Table T5).

Table T5. Final model for EPDS in Spontaneous conception group (square-root transformed)

	Estimate	Std. Error	p-value
Intercept	0.3225	0.2975	0.2798
Partner support = Very much / Extremely	-0.4158	0.1301	0.0016
STAI – Trait anxiety	0.0538	0.0062	<0.0001
REM-71 Factor 1 – Immature defenses	0.1761	0.0562	0.0020

In the ART group**,** pregnancy complications (β = 0.459, p = 0.040), low family support (β = −0.540, p = 0.008), trait anxiety (β = 0.027, p = 0.018), and immature defenses (β = 0.298, p = 0.006) resulted as significant predictors of depressive symptoms (see Tables T6).

Table T6. Final model for EPDS in ART group (square-root transformed)

Variable	Estimate	Std. Error	p-value
Intercept	1.1554	0.5119	0.0278
Pregnancy complications	0.4587	0.2185	0.0401
Family support = Very much / Extremely	-0.5399	0.1974	0.0082
STAI – Trait anxiety	0.0269	0.0110	0.0177
REM-71 Factor 1 – Immature defenses	0.2979	0.1037	0.0057

2.3.5. UCLA Loneliness

Mean loneliness score (UCLA) was 40.2 (SD = 9.4). In terms of clinical categories, according to the clinical cut-off, 28% of women reported low loneliness (20-34), 53% were in the moderate range (34-49), 18% in the moderately high range (50-64), and only 0.7% in the high range (65-80) (Boffo et al., 2012; Russell, 1996). No statistically significant difference was found between groups (p = 0.882; see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode).

Regarding correlational analyses, in both conception group UCLA score positively correlated with trait anxiety (STAI Y2), immature defenced mechanisms (REM-71 Factor 1) and antenatal attachment (MAAS). Moreover, in the ART group, it was also negatively correlated with

mature defenced mechanisms (REM-71 Factor 2) (see Tables S4–S5 for full correlation matrices).

In multivariate analyses, lower partner support (β = −0.437, p = 0.002), higher trait anxiety (STAI-Y2 β = 0.054, p < 0.001), and higher immature defenses (REM-71 Factor 1; β = 0.207, p = 0.001) were significant predictors of loneliness in the spontaneous conception group (see Table T7)**.**

Table T7. Final model for UCLA in Spontaneous conception group

	Estimate	Std. Error	p-value
Intercept	0.2015	0.3201	0.5297
Partner support = Very much / Extremely	-0.4369	0.1387	0.0019
STAI – Trait anxiety	0.0537	0.0065	<0.0001
REM-71 Factor 1 – Immature defenses	0.2070	0.0614	0.0009

In the ART group**,** working after the 20th week of pregnancy (β = 4.024, p = 0.040), lower family support (β = −8.289, p < 0.001), and higher trait anxiety (STAI-Y2; β = 0.551, p < 0.001) were significant predictors of increased loneliness (see Tables T8).

Table T8. Final model for UCLA in ART group

Variable	Estimate	Std. Error	p-value
Intercept	21.8879	4.6974	<0.0001
Working after the 20th week of pregnancy	4.0236	1.9225	0.0400
Family support = Very much / Extremely	-8.2886	1.9069	<0.0001
STAI – Trait anxiety	0.5511	0.0938	<0.0001

2.3.6. MAAS Maternal Antenatal Attachment

The mean total score on the Maternal Antenatal Attachment Scale (MAAS) was 50.6 (SD = 3.0), indicating moderate levels of maternal–fetal attachment, in line with the scale's

interpretive framework (Condon & Corkindale, 1993; Busonera et al., 2016). No significant differences were found between groups for MAAS total, quality, or intensity scores ($p > 0.05$, see Table S3 for descriptive analyses of psychological outcomes stratified by conception mode). Regarding correlational analyses, MAAS Intensity was negatively correlated with trait anxiety (STAI-Y2) in both groups. In the spontaneous conception group, MAAS Quality was also negatively correlated with mature defense mechanisms (REM-71 Factor 2) (see Tables S4–S5 for full correlation matrices).

In multivariate analyses, for the spontaneous group, working after the 20th week of pregnancy ($\beta = 0.104$, $p = 0.004$) and pregnancy-related worries about body appearance (PRAQ – Concern Appearance; $\beta = 0.011$, $p = 0.024$) were positively associated with higher attachment quality scores (MAAS - Quality).

At the same time, previous unintentional pregnancy interruption ($\beta = 0.952$, $p = 0.023$) was associated with higher attachment intensity (MAAS - Intensity**)**, whereas higher state anxiety (STAI-Y1; $\beta = -0.080$, $p < 0.001$) and immature defenses (REM-71 Factor 1; $\beta = -0.161$, $p < 0.001$) were associated with lower intensity scores (see Tables T9–T10).

Table T9. Final model MAAS Quality in Spontaneous conception group (square-root transformed)

	Estimate	Std. Error	p-value
Intercept	4.9594	0.0449	<0.0001
Working after the 20th week of pregnancy	0.1043	0.0354	0.0036
PRAQ – Concern Appearance	0.0109	0.0048	0.0244

Table T10. Final model for MAAS Intensity in Spontaneous conception group

	Estimate	Std. Error	p-value
Intercept	28.6242	0.7925	<0.0001
Unintentional pregnancy interruption	0.9521	0.4143	0.0226
STAI – State anxiety	-0.0795	0.0205	0.0001
REM-71 Factor 1 – Immature defenses	-0.1611	0.0449	0.0004

In the ART group, lower trait anxiety (STAI-Y2; β = −0.007, p = 0.045), higher pregnancy-related worries about having a disabled child (PRAQ – Worries Disabled Child; β = 0.016, p = 0.019), and higher loneliness (UCLA; β = 0.009, p = 0.005) were positively associated with attachment quality scores (MAAS – Quality). For attachment intensity subscale (MAAS – Intensity), only higher trait anxiety (STAI-Y2; β = −0.098, p = 0.004) was associated with lower scores (see Tables T11–T12).

Table **T11.** Final model for MAAS Quality in ART group (square-root transformed)

Variable	Estimate	Std. Error	p-value
Intercept	4.8423	0.1189	<0.0001
STAI – Trait anxiety	-0.0071	0.0035	0.0454
PRAQ – Worries Disabled Child	0.0159	0.0066	0.0194
UCLA	0.0090	0.0030	0.0045

Table T12. Final model MAAS Intensity in ART group

Variable	Estimate	Std. Error	p-value
Intercept	28.3072	1.3042	<0.0001
STAI – Trait anxiety	-0.0979	0.0323	0.0036

2.4. Discussion

In the present study, maternal mental health was investigated in women who conceived spontaneously and those who conceived through assisted reproductive techniques (ART) during the third trimester of pregnancy, in order to explore potential differences in emotional distress levels and related predictive factors.

Although mean levels of psychological symptoms were overall in the low to moderate range, a closer look at clinical categories reveals that a considerable proportion of women reported at least moderate levels of distress. Specifically, 41% of participants reported moderate to high levels of state anxiety, 35% reported at least moderate depressive symptoms, and approximately 72% experienced moderate or higher levels of loneliness.

These findings are broadly in line with previous literature on perinatal mental health (Yin et al., 2022; Araji et al., 2020; Ayers et al., 2024; Val & Míguez, 2023; Alzahrani et al., 2023; Kent-Marvick et al., 2022), confirming that even in non-clinical community samples, a non-negligible subgroup of women experiences moderate levels of psychological distress during pregnancy. This proportion, while not the majority, remains clinically meaningful and highlights the importance of early identification and support to prevent escalation of symptoms and promote maternal well-being. Notably, loneliness levels were particularly elevated, suggesting that social disconnection may represent a relevant psychosocial vulnerability even in the absence of marked clinical distress.

In parallel, no significant differences were observed between ART and spontaneous conception groups in any of the psychological outcomes, except for a non-significant trend toward higher depressive symptoms in the ART group. This pattern is consistent with our hypothesis and with some previous studies reporting similar or slightly higher levels of emotional vulnerability in women who conceived through ART (Si et al., 2024; Burgio et al., 2022). A plausible interpretation is that ART may act as a contextual stressor primarily during the conception and early pregnancy phases, while its emotional impact may diminish as pregnancy progresses and becomes more stable (Burgio et al., 2022). However, an important contextual factor to consider when interpreting these findings is that all participants were attending a structured antenatal preparation course at the time of assessment, delivered by a multidisciplinary team including midwives and psychologists. Previous research has shown that such antenatal classes can act as a protective factor, being associated with reduced anxiety and depressive symptoms and increased perceived support (Krysa et al., 2016; Barimani et al., 2018). This shared contextual resource may have contributed to the overall low to moderate levels of psychological symptoms observed in this sample.

Furthermore, several individual and contextual factors emerged as significant predictors of psychological outcomes in pregnancy.

Our findings highlight that trait anxiety, immature defense mechanisms, pregnancy complications, working after the 20th week of pregnancy, and previous psychopathological symptoms acted as risk factors for maternal mental health during the third trimester.

Conversely, partner and family support, mature defense mechanisms, and receiving psychological support, emerged as protective factors. Moreover, state and trait anxiety, loneliness, pregnancy-related anxiety, immature defense mechanisms, working after the 20th week of pregnancy, and previous unintentional pregnancy interruption were significant predictors of maternal antenatal attachment.

Specifically, trait anxiety emerged as a significant risk factor across both groups, predicting higher levels of state anxiety, depressive symptoms, and loneliness. This finding is consistent with the conceptualization of trait anxiety as a stable individual vulnerability that increases emotional reactivity and lowers the threshold for experiencing distress during pregnancy (Alzahrani et al., 2023). Moreover, higher trait anxiety significantly predicted lower antenatal attachment intensity, suggesting a possible interference with maternal–fetal bonding through increased preoccupations and reduced emotional availability (Pellerone et al., 2023). These results highlight its role as a transversal risk factor, independent of conception mode.

Regarding defensive functioning, immature defense mechanisms emerged as significant risk factors for psychological distress in both groups, being associated with higher levels of depressive symptoms and pregnancy-related anxiety. Notably, in the spontaneous conception group, immature defenses also predicted higher loneliness scores, suggesting that less adaptive regulatory strategies may heighten perceptions of social disconnection and vulnerability during pregnancy. In addition to shaping internal perceptions, such defenses may also influence interpersonal dynamics—sometimes leading to relational patterns that unintentionally distance others—thereby reinforcing feelings of isolation. From a psychological perspective, reliance on

immature defenses such as denial, projection, or dissociation may limit reflective functioning, amplify negative affect, and hinder the use of more flexible coping strategies, thereby increasing emotional distress (Porcerelli et al., 2022; Carone et al., 2025). In addition, in the spontaneous conception group, immature defenses were negatively associated with antenatal attachment intensity. This finding is consistent with recent evidence suggesting that defensive functioning influences early relational processes by shaping emotional availability and the capacity to engage in the developing maternal–fetal relationship (Porcerelli et al., 2022; Carone et al., 2025).

Furthermore, working after the 20th week of pregnancy showed differential associations across conception groups, suggesting that the psychological meaning of remaining employed during late pregnancy may vary depending on maternal context. In fact, in the ART group, continuing to work was associated with higher levels of loneliness. A plausible explanation is that late-gestation work may intensify the cumulative demands involved in simultaneously managing professional responsibilities, medical appointments, physical changes, and pregnancy-related concerns, and reduce the time and emotional availability for seeking support or engaging in antenatal care activities (Kobayashi et al., 2024; Fall et al., 2015). This effect may be particularly pronounced when pregnancy is perceived as medically fragile, as often occurs following assisted reproduction, potentially amplifying feelings of vulnerability and isolation (Ikemoto et al., 2021). At the same time, in the spontaneous conception group, working after the 20th week was associated with higher pregnancy-related anxiety, specifically regarding fears of fetal disability. This may reflect increased exposure to environmental stressors or reduced opportunities for rest and psychological adjustment in the last trimester (Kobayashi et al., 2024). However, in the same group, continuing to work also predicted higher maternal–fetal attachment quality, suggesting a potentially dual role. Remaining engaged in work life may help some women preserve a sense of normality, personal efficacy, and social connectedness,

which can support the development of emotional investment in the pregnancy (Míguez et al., 2021).

These findings mirror the heterogeneous evidence in the literature regarding the impact of occupational activity in late pregnancy, which has been linked to both stress-related outcomes and protective psychosocial effects, depending on individual and contextual factors such as perceived support, job stress, and pregnancy risk perception (Kobayashi et al., 2024; Gowda et al., 2022; Míguez et al., 2021).

Furthermore, in the ART group only, complications during pregnancy predicted both higher pregnancy-related worries and higher depressive symptoms. This is consistent with the notion that a more medicalized or high-risk pregnancy course may increase perceived threat and rumination about fetal and maternal outcomes. Such effects may be particularly pronounced in women who conceive through medical support, where prior infertility experiences and treatment burden can heighten risk appraisal and emotional vulnerability (Gourounti et al., 2015; Galbally et al., 2024).

Finally, previous psychopathological symptoms emerged as a significant risk factor only in the spontaneous conception group, predicting higher levels of pregnancy-related anxiety. This finding is well documented in previous research, highlighting that a history of psychopathological symptoms is among the most robust predictors of emotional distress during pregnancy (Alzahrani et al., 2023). Pregnant women with previous psychopathological symptoms may exhibit heightened sensitivity to perceived threats and uncertainty, which can amplify pregnancy-specific worries and concerns regarding fetal health (Alzahrani et al., 2023).

On the other hand, several protective factors emerged, buffering against emotional distress and supporting maternal well-being during pregnancy. Among these, perceived partner and family support played a central role, with partially different patterns across conception groups.

Specifically, in the spontaneous conception group, higher partner support was associated with lower levels of depressive symptoms and loneliness. These findings are consistent with robust evidence indicating that partner support is one of the most significant buffers against perinatal emotional distress, particularly during late pregnancy (Biaggi et al., 2016; Alipour et al., 2018; Alzahrani et al., 2023). Partner support may provide emotional reassurance, enhance feelings of security, and mitigate perceived stress, thereby reducing depressive symptomatology and subjective feelings of isolation. Although no significant association was observed in the ART group, this may be partly explained by the very high overall levels of perceived partner support in the sample, which likely limited variability and statistical power to detect group-specific effects.

Conversely, in the ART group, it was family support that emerged as protective against both depressive symptoms and loneliness. This may reflect the specific relevance of a broader support network in pregnancies often experienced as medically or emotionally complex following assisted reproduction (Ramya et al., 2025). Moreover, in the spontaneous conception group, family support was also associated with lower state anxiety, suggesting that a supportive relational environment may help maintain emotional stability during pregnancy. These findings are in line with previous research highlighting the central role of partner and family support in reducing perinatal stress, depressive symptoms, and anxiety, and in promoting maternal well-being and adjustment (Biaggi et al., 2016; Alipour et al., 2018; Alzahrani et al., 2023).

Finally, in the ART group, both mature defense mechanisms and receiving psychological support emerged as protective factors against pregnancy-related anxiety. This suggests that psychological well-being in this group may be sustained by a combination of internal adaptive strategies and external support resources. Mature defenses are generally associated with more flexible and effective emotion regulation (Cramer, 2015), which may help women manage pregnancy-specific worries more adaptively. At the same time, psychological support can

provide reassurance, containment, and coping resources in pregnancies often experienced as medically fragile and emotionally intense (Ramya et al., 2025).

Interestingly, some psychological experiences traditionally considered as stress-related were associated with higher maternal–fetal attachment. In the spontaneous conception group, pregnancy-related worries about body appearance and previous unintentional pregnancy interruption were associated with higher attachment quality and intensity, respectively. This may reflect the hypothesis that heightened concerns or previous loss experiences could foster increased emotional investment in the pregnancy, possibly as a way to maintain a sense of closeness and control (Chemouny et al., 2024). Similarly, in the ART group, pregnancy-related worries about having a disabled child and higher loneliness predicted greater attachment quality. In particular, feelings of loneliness may be linked to a stronger emotional focus on the fetus, as women experiencing social disconnection might turn more inward, making the prenatal bond a central emotional anchor during pregnancy. While these factors are not protective per se, they may coexist with a more intense emotional bond, especially in contexts characterized by heightened perceived vulnerability. However, these findings do not appear to be reflected in the existing literature, where loneliness and pregnancy-related distress are generally associated with poorer psychological outcomes and reduced bonding (Ranjbar et al., 2020; Kent-Marvick et al., 2022;). This highlights the complex interplay between emotional distress and attachment processes during pregnancy and points to the importance of further exploring these pathways.

Overall, the predictive pattern was largely similar between ART and spontaneous conception groups, with trait anxiety and defense mechanisms showing a stable impact across both. Contextual factors such as complications, psychological support, working status appeared to have a specific pattern in the ART group. These differences may reflect distinct psychosocial trajectories associated with the two conception pathways, underlines the importance of

considering both shared and group-specific predictors when assessing emotional well-being during pregnancy.

2.5. Conclusion

This study provides an initial overview of maternal psychological well-being during late pregnancy.

From a clinical perspective, these findings underscore the importance of early screening and preventive interventions, even in non-clinical populations. Although most participants reported subthreshold symptoms, a clinically meaningful subgroup experienced moderate distress—particularly loneliness—indicating that psychological vulnerability may be present even in the absence of overt psychopathology.

Notably, no significant differences emerged between ART and spontaneous conception groups, supporting the hypothesis that ART may act as a contextual stressor primarily in earlier pregnancy phases, with reduced emotional impact later on. However, assessments at subsequent time points may offer a clearer picture of potential group-specific trajectories.

Furthermore, trait anxiety and immature defense mechanisms consistently emerged as key risk factors for emotional distress, whereas partner and family support and more adaptive defensive functioning acted as protective factors. Additional contextual elements—such as pregnancy complications in ART and previous psychopathological symptoms in spontaneous conception—underline the need to consider both shared and group-specific vulnerabilities in clinical assessment (Biaggi et al., 2016; Thanscheidt et al., 2023).

Identifying these stable and contextual factors can guide the development of tailored preventive strategies. Strengthening social support networks, including the active involvement of partners, and offering timely psychological care may help buffer distress and promote maternal well-being, particularly in women with heightened vulnerability, thereby informing perinatal mental health programs and antenatal care pathways.

3. Maternal Well-being Across the Perinatal Transition: Six-Month Follow-up

3.1. Introduction

Maternal mental health in the postpartum period has emerged as a critical field of investigation due to its well-documented implications for maternal functioning, infant development, and the quality of early caregiving relationships (Marriott & Ferguson-Hill, 2014).

Psychological distress during this period has been associated with impaired sensitivity to infant cues, difficulties in bonding, and increased risk for adverse child developmental outcomes, including emotional and behavioral problems (Jithesh, 2024).

The transition to motherhood, while often culturally idealized, is frequently accompanied by psychological vulnerability. In particular, depressive and anxious symptoms, difficulties in emotional bonding with the infant, and experiences of loneliness or social isolation represent key areas of concern in the weeks and months following childbirth (Grigoriadis et al., 2018; Shivairová et al., 2024).

Since the advent of Assisted Reproductive Technologies (ART), growing attention has been devoted to understanding how the mode of conception may influence maternal mental health trajectories. What began as a focus on infertility-related distress has gradually shifted toward more nuanced comparisons between women who conceived spontaneously and those who conceived via ART (Furmli et al., 2019). This line of research has become increasingly relevant as ART births continue to rise globally, now accounting for over 5% of annual deliveries in several countries (Sunderam et al., 2022), and reaching 8% in some European regions (ESHRE, 2019). Despite this growing prevalence, ART pregnancies are still frequently perceived as medically and emotionally “at-risk.” This perception may stem from the emotional burden

associated with infertility, the medicalization of pregnancy, and the heightened expectations surrounding motherhood, all of which may contribute to increased psychological vulnerability (Galbally et al., 2024). A key question is whether these stressors represent a transient burden limited to the conception and early pregnancy phases, or whether they exert longer-term psychological effects extending into the postpartum period.

Postpartum depression and anxiety are recognized as the most prevalent psychological conditions affecting new mothers, yet the literature on their manifestation and intensity across different conception modalities remains unclear. While many studies report no significant differences, or even lower levels of postpartum distress, in ART mothers compared to those who conceive spontaneously, possibly due to factors such as psychological preparedness, stronger parental motivation, or enhanced healthcare access (Koukopoulos et al., 2020; Furmli et al., 2019), other research points to heightened vulnerability, particularly in the later stages of pregnancy and the early postpartum period (Zargar et al., 2023; Galbally et al., 2024). These mixed findings suggest that static group comparisons may obscure important temporal patterns in psychological adjustment.

Psychosocial factors, such as pregnancy-related stress, duration of infertility, type of delivery, and the availability of social support, may further shape these variations, underscoring the importance of longitudinal research to identify windows of increased vulnerability and opportunities for targeted preventive intervention (Simoni et al., 2022; Galbally et al., 2024; Grønlund et al., 2025).

In addition to symptomatic outcomes, difficulties in maternal–infant bonding represent a significant area of concern in the postpartum period. Impaired bonding has been associated with adverse child developmental outcomes and compromised maternal self-efficacy (Shivairová et al., 2024). However, relatively few studies have examined postnatal attachment patterns in ART

versus spontaneous conception cohorts, and existing evidence remains inconclusive (Pellerone et al., 2023; Galbally et al., 2024).

Furthermore, the role of psychosocial and psychological predictors—both during pregnancy and following childbirth—warrants closer attention. A variety of risk factors have been associated with poorer postpartum outcomes, including a personal or familial psychiatric history, limited social support, recent life stressors, financial difficulties, medical complications during pregnancy or delivery, and poor sleep quality (Ross et al., 2011; Araji et al., 2021; Burgio et al., 2022; Al-abri, 2023). Conversely, protective factors such as partner involvement, resilience, and access to psychological support have been shown to buffer against postpartum distress (Antoniou et al., 2021; Burgio et al., 2022; Araji et al., 2021). Among the psychological processes implicated in postpartum adjustment, defense mechanisms remain a relatively underexplored area. Preliminary findings (Carone et al., 2025) suggest they may influence how women manage emotional demands in the early stages of motherhood, shaping their ability to regulate affect and adapt to new relational and caregiving roles. This is in line with our baseline findings (T0), which identified immature defense mechanisms as risk factors for psychological vulnerability during pregnancy.

Additionally, prenatal attachment has been proposed as a possible protective factor or early indicator of postnatal adjustment. However, its predictive validity remains debated, with some studies reporting positive associations with postnatal bonding and others highlighting more complex or inconsistent patterns (Rollè et al., 2020; Rossen et al., 2016).

To address these gaps, the present study represents the follow-up (T1) of the “Maternal Wellbeing (Benessere Materno)” project, a longitudinal web-based investigation tracking psychological health in first-time mothers from the third trimester of pregnancy through the postpartum period. Specifically, this phase aims to assess the presence of depressive and anxious symptoms, feelings of loneliness and maternal–infant bonding quality after childbirth.

Moreover, it seeks to examine whether psychological dimensions assessed during pregnancy, including prenatal attachment, mental health symptoms, and defense mechanisms, can predict postpartum adjustment, with specific attention to the role of conception mode.

3.2. Methods

3.2.1. Participants and Procedure

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the IRCCS San Raffaele Scientific Institute (protocol n. CET 012-2024).

After providing informed consent, participants completed an online survey administered via Qualtrics. An invitation to complete the second survey (T1) was sent via e-mail to all participants six months after they had completed the baseline assessment. The study was conducted between March and September 2025. Participants were matched across time points using their e-mail address and date of birth, which were collected for this purpose at baseline.

In total, 97 participants completed the second survey. Twenty-one were excluded due to unmatched baseline data or incomplete responses. Statistical analyses were therefore conducted on a final sample of 76 respondents.

To evaluate the potential impact of attrition, participants who completed both assessments were compared with those who did not complete the follow-up on key sociodemographic and baseline psychological variables. No significant differences emerged between completers and non-completers, suggesting that attrition was unlikely to be systematically associated with baseline characteristics. Missing data were handled by restricting longitudinal analyses to participants with complete data at both time points (complete-case analysis). Given the exploratory nature of the study and the relatively small sample size at follow-up, no imputation procedures were applied.

Regarding the number of predictors in the regression at T1, we considered all variables which were not collinear, due to the exploratory nature of the analysis. A backward variable selection based on the p-value of the test on the coefficient was performed, in order to be conservative in the results due to the limited sample size.

3.2.2. Measures

Data collection included standardized, validated self-report questionnaires assessing depressive symptoms, anxiety symptoms, loneliness, and postnatal maternal–infant attachment.

Additional ad hoc items collected information on delivery (mode of birth, maternal or neonatal complications), breastfeeding, perceived support from partner, family, and healthcare professionals, and satisfaction with hospital care.

The State-Trait Anxiety Inventory Form Y (STAI-Y; Spielberger & Sydeman, 1994; Pedrabissi & Santinello, 1989) is a 40-item questionnaire designed to assess general anxiety symptoms. It is divided into two subscales of 20 items each, measuring state (Y1) and trait (Y2) anxiety separately. Items are rated on a 4-point Likert scale (1 = not at all to 4 = very much so), with total scores ranging from 20 to 80 for each scale. Clinically, anxiety is categorized as low (20–39), moderate (40–59), and high (60–80). Internal consistency is high for both scales ($\alpha = 0.86$–0.95 for state; $\alpha = 0.89$–0.91 for trait), with moderate test-retest reliability.

The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987; Benvenuti et al., 1999) is a 10-item self-report questionnaire used to screen for depression symptoms during the perinatal period. Items are rated on a 4-point scale (0 to 3), assessing the frequency of symptoms experienced over the past week. Total scores range from 0 to 30, with higher scores indicating greater depressive symptomatology. Clinically, depression symptoms are categorized as low (0-9), moderate (9-12) and high (>12) (Palumbo et al., 2016). The EPDS has demonstrated good internal consistency (Cronbach's alpha between .79 and .87) and split-half reliability (> .80).

The UCLA Loneliness Scale-Version 3 (UCLA S3; Boffo et al., 2012; Russell, 1996) is a 20-item self-report questionnaire designed to assess feelings of loneliness. Items are rated on a 4-point Likert scale (from 1 = never to 4 = always), with a total score ranging from 20 to 80. This scale has been widely used in the perinatal period, showing good psychometric properties, including internal consistency (Cronbach's alpha = .89–.94) and test-retest reliability (r = .73). The Italian version (Boffo et al., 2012) supports a three-factor structure: Isolation (relational dissatisfaction), Relational connectedness (emotional loneliness and unmet attachment needs), and Trait loneliness (personality-based tendencies such as shyness and low extroversion). Clinically, lonliness is categorized as low (20–34), moderate (35–49), moderately high (50–64) and high (65–80) (Russell, 1996).

The Postpartum Bonding Questionnaire (PBQ; Brockington et al., 2006; Busonera et al., 2017) is a 25-item self-report measure used to assess potential disorders in the early mother–infant bond. Items are rated on a 6-point frequency scale (0 = always; 5 = never), with higher scores indicating greater bonding difficulties. A total score ≥26 suggests impaired bonding, while scores ≥40 indicate severe impairment. The Italian version (Busonera et al., 2017) supports a three-factor structure reflecting maternal rejection, emotional distancing, and caregiving anxiety. However, given inconsistent factorial solutions, the total score is generally used. The PBQ shows adequate internal consistency, with Cronbach's alpha ranging from .76 to .87.

3.2.3. Statistical Analysis

Categorical variables were described as absolute and relative frequencies. Continuous variables were summarized by median and interquartile range (IQR), as well as by mean and standard deviation (SD).

Differences between women who conceived spontaneously and those who conceived through assisted reproductive techniques (PMA) were evaluated using Fisher's exact test for categorical

variables and the Mann–Whitney test for numerical variables. Changes in state anxiety (STAI-Y1), depressive symptoms (EPDS), and loneliness (UCLA) between T0 and T1 were assessed using the Wilcoxon signed-rank test for paired samples.

Correlations between psychological variables at T0 and those at T1 were evaluated using Spearman's rank correlation coefficient.

Finally, multiple linear regression analyses were performed to identify factors independently associated with psychological outcomes at T1.

In order to meet the assumptions of the model, if necessary, an appropriate transformation of the dependent variable was applied and outliers of the model were excluded. A backward variable selection procedure was used to identify the most parsimonious model, starting from an initial set of predictors defined a priori based on theoretical assumptions.

For each psychological outcome, two sets of multiple linear regression models were estimated.

The first set included only postpartum clinical and psychosocial predictors: age group (≤35 vs >35 years), conception group (spontaneous vs PMA), birth type, maternal and neonatal complications, perceived support from healthcare staff, emotional experience related to breastfeeding, psychological support after childbirth, and partner support. The second set included the same postpartum predictors together with psychological measures reflecting maternal emotional well-being at T0—namely, state and trait anxiety (STAI-Y1), immature and mature defenses (REM-71 Factors 1 and 2), pregnancy-related worries (PRAQ), loneliness (UCLA), depressive symptoms (EPDS), and maternal–fetal attachment (MAAS – Quality and Intensity). This two-step analytical strategy allowed us to first assess the specific contribution of postpartum factors and then to evaluate their independent effects after accounting for baseline psychological characteristics.

A significance level of 5% was defined for all analyses. All statistical analyses were carried out using R software (version 4.4.3).

3.3. Results

3.3.1. Sample Characteristics

A total of 76 women participated in the follow-up assessment (T1), six months after the baseline assessment conducted during the third trimester of pregnancy (T0). Most births were natural (72%), with a cesarean delivery reported in 28% of cases. Maternal and neonatal complications occurred in 21% and 17% of the sample, respectively. More than half of the participants reported perceiving high levels of support from healthcare staff during the perinatal period (53%), and the majority were breastfeeding at T1 (89%). Among those who breastfed, 67% described their emotional experience as positive. Only a minority reported having received psychological support after childbirth (13%), whereas 61% perceived strong support from their partner during the postpartum period.

Participants were stratified according to mode of conception: spontaneous conception (n = 53) and medically assisted reproduction (PMA, n = 23). Women in the PMA group were significantly more likely to be over 35 years of age at T0 (87% vs 53%, $p = 0.0047$). Although no significant group differences emerged for maternal complications, delivery mode, or psychosocial support, there was a trend toward a higher prevalence of neonatal complications in the PMA group (30% vs 11%, $p = 0.053$). No significant between-group differences were observed in breastfeeding rates, emotional experience of breastfeeding, postpartum psychological support, or partner support (see Table S1. for sociodemographic and clinical characteristics stratified by conception mode).

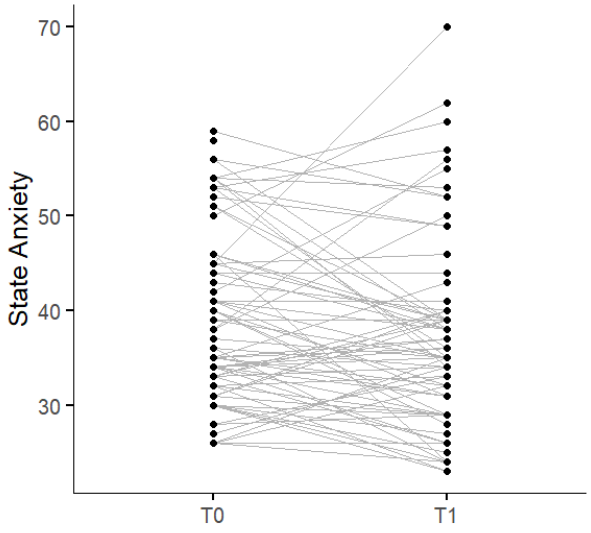
3.3.2. STAI-Y State Anxiety

At the post-partum (T1), maternal mean state anxiety (STAI-Y1) was 37.1 (SD = 9.93). In terms of clinical categories, according to the clinical cut-offs, most women (74%) reported low state anxiety (20-39), 22% were in the moderate range (40-59), and only 4.1% in the high range (60-80) (Spielberger & Sydeman, 1994; Pedrabissi & Santinello, 1989).

A non-significant trend toward higher anxiety was observed among women who conceived through assisted reproductive techniques compared to those with spontaneous conception (M = 41.14, SD = 8.13 vs. M = 35.49, SD = 12.80 $p = 0.0735$).

On the other hand, when examining changes over time between late pregnancy (T0) and follow-up (T1) in the overall sample, a significant decrease in state anxiety was found (Mean T0 = 39.30, SD = 8.98; Mean T1 = 37.09, SD = 9.93; $p = 0.0204$), indicating an overall reduction in anxiety levels from the prenatal to the postpartum period (see Figure 1).

Figure 1. State Anxiety (STAI-Y1) T0 vs T1



Regarding correlational analyses, conducted on the entire sample, state anxiety positively correlated with anxiety levels during pregnancy (STAI-Y1 T0), with trait anxiety (STAI-Y2 T0), pregnancy-related worries (PRAQ T0), loneliness at T0 UCLA), depressive symptoms at T0 (EPDS), and immature defenses (REM-71 Factor 1). Conversely, a negative correlation emerged with maternal–fetal attachment intensity, miseured during pregnancy (MAAS, T0). Full correlation matrices are provided in Supplementary Tables S2.

In the multivariate regression models conducted on the entire sample and including postpartum factors, lower levels of perceived support from healthcare staff (β = –0.4150, p = 0.0106), a negative or neutral emotional experience related to breastfeeding (β = –0.3630, p = 0.0343), and lower partner support (β = –0.5420, p = 0.0013) were independently associated with higher state anxiety at T1 (see Table T1).

Table T1. Final model for state anxiety including only postpartum predictors (STAI-Y1; square-root transformed)

	Estimate	Std. Error	p-value
Intercept	6.7773	0.1999	<0.0001
Support healthcare staff = much/very much	-0.4150	0.1574	0.0106
Breastfeeding experience_emotional = positive	-0.3630	0.1677	0.0343
Partner support T1 = much/very much	-0.5420	0.1613	0.0013

When prenatal psychological and clinical variables were added to the model, conception via PMA (β = 0.3908, p = 0.0077), immature defenses (β = 0.2745, p = 0.0018), lower mature defenses (β = –0.1942, p = 0.0172), higher state anxiety levels at T0 (β = 0.0295, p = 0.0009), and pregnancy-related worries about body image (β = 0.0455, p = 0.0429) were significant predictors of state anxiety at T1, together with low postpartum partner support (β = –0.3696, p = 0.0057) (see Table T2).

Table T2. Final model for state anxiety including postpartum predictors and psychological outcomes at T0 (STAI-Y1; square-root transformed)

	Estimate	Std. Error	p-value
Intercept	4.6961	0.5758	<0.0001
PMA	0.3908	0.1422	0.0077
Partner support T1 = much/very much	-0.3696	0.1295	0.0057
REM-71 Factor 1 – Immature defenses T0	0.2745	0.0845	0.0018
REM-71 Factor 2 – Mature defenses T0	-0.1942	0.0795	0.0172
STAI-Y - State anxiety T0	0.0295	0.0085	0.0009
PRAQ Concern Appearance T0	0.0455	0.0221	0.0429

3.3.3. EPDS Depressive Symptoms

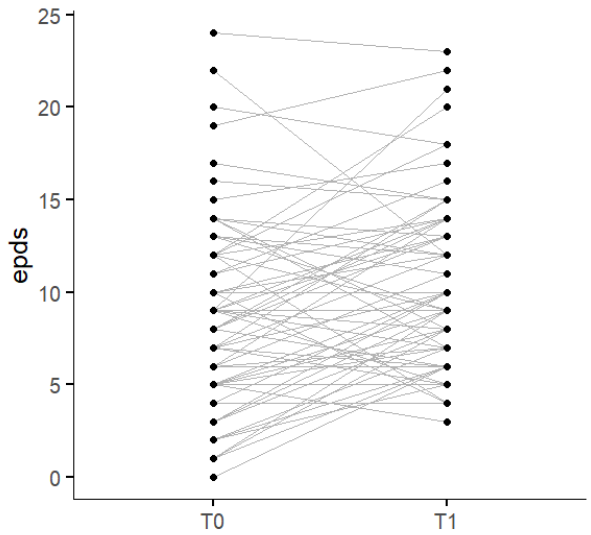
At T1, maternal depressive symptoms measured with the Edinburgh Postnatal Depression Scale (EPDS) had a mean score of 10.2 (SD = 4.54). Based on clinical cut-offs, 57% of women

reported low depressive symptoms (0-9), 33% were in the moderate range (9-12), and 10% were in the high range (>12) (Cox et al., 1987).

No significant differences in EPDS scores were found between women who conceived spontaneously and those who conceived through assisted reproductive techniques (M = 10.02, SD = 3.95 vs. M = 10.62, SD = 5.87; $p = 0.9760$).

At the same time, when examining changes over time, depressive symptoms increased significantly between late pregnancy (T0) and T1 in the overall sample (Mean T0 = 8.62, SD = 5.28; Mean T1 = 10.19, SD = 4.54; $p = 0.0009$), indicating a worsening of depressive symptoms from the prenatal to the postpartum period (see Figure 2).

Figure F1. EPDS scores at T0 vs T1.



Correlational analyses (full matrix in Supplementary Table S2) showed that EPDS scores at T1 were positively associated with depressive symptoms, loneliness, trait and state anxiety, pregnancy-related worries, and immature defenses measured at baseline. Conversely, a negative association emerged with antenatal maternal attachment.

Regarding the multivariate regression models conducted on the entire sample and including postpartum factors, lower levels of partner support were significantly associated with higher depressive symptoms at T1 (β = –0.5354, $p = 0.0007$) (see Table T3).

Table T3. Final model for EPDS including only postpartum predictors (square-root transformed)

	Estimate	Std. Error	p-value
Intercept	3.4267	0.1188	<0.0001
Partner support T1 = much/very much	-0.5354	0.1513	0.0007

When prenatal psychological variables were added to the model, lower mature defenses (β = –0.1944, $p = 0.0077$), higher EPDS scores at T0 (β = 0.0730, $p < 0.0001$), and lower postpartum partner support (β = –0.3210, $p = 0.0152$) were significant predictors of postpartum depressive symptoms (see Table T4).

Table T4. Final model for EPDS including postpartum predictors and psychological outcomes at T0 (square-root transformed)

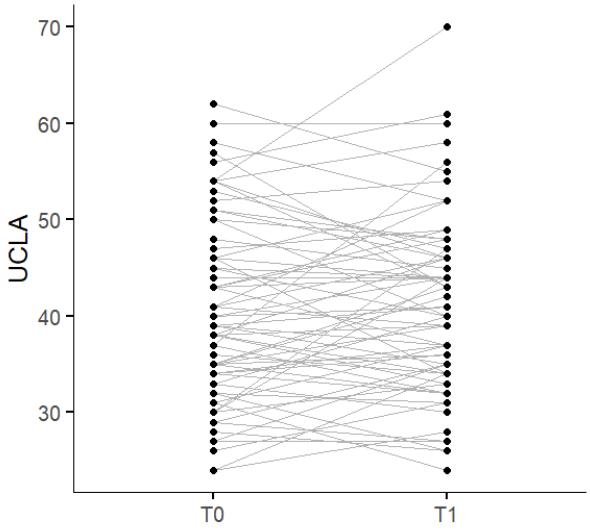
	Estimate	Std. Error	p-value
Intercept	3.7450	0.4200	<0.0001
Partner support T1 = much/very much	-0.3210	0.1289	0.0152
REM-71 Factor 2 – Mature defenses T0	-0.1944	0.0708	0.0077
Epds T0	0.0730	0.0125	<0.0001

3.3.4. UCLA Loneliness

At T1, loneliness measured with the UCLA Loneliness Scale had a mean score of 40.9 (SD = 9.15). In terms of clinical categories, according to the clinical cut-off, 26% of women reported low loneliness (20-34), 60% were in the moderate range (34-49), 13% in the moderately high range (50-64), and only 1.4% in the high range (65-80) (Russell, 1996).

No significant differences were found between women who conceived spontaneously and those who conceived through assisted reproductive techniques (M = 40.37, SD = 8.92 vs. M = 42.15, SD = 9.86; $p = 0.7340$). Similarly, when examining changes over time, loneliness levels did not significantly differ between late pregnancy (T0) and T1 (Mean T0 = 40.30, SD = 9.55; Mean T1 = 40.86, SD = 9.15; $p = 0.3850$), remaining within the moderate range. (see Figure F3).

Figure F3. UCLA scores at T0 vs T1.



Correlational analyses showed that UCLA scores at T1 were positively associated with loneliness, state and trait anxiety, pregnancy-related worries, depressive symptoms, and immature defenses measured at baseline. Conversely, a negative association emerged with

antenatal maternal–fetal attachment. Full correlation matrices are provided in Supplementary Tables S2.

Regarding the multivariate regression models conducted on the entire sample and including postpartum factors, lower levels of perceived support from healthcare staff (β = –3.5509, p = 0.0396), a negative or neutral emotional experience related to breastfeeding (β = –9.9160, p < 0.0001), and lower partner support (β = –6.9998, p = 0.0002) were independently associated with higher loneliness at T1 (see Table T5).

Table T5. Final model for UCLA including only postpartum predictors

	Estimate	Std. Error	p-value
Intercept	53.8385	2.2083	<0.0001
Support healthcare staff = much/very much	-3.5509	1.6880	0.0396
Breastfeeding experience_emotional = positive	-9.9160	1.7922	<0.0001
Partner support T1 = much/very much	-6.9998	1.7604	0.0002

When prenatal psychological variables were added to the model, negative or neutral emotional experience related to breastfeeding (β = –4.2309, p = 0.0041) and baseline loneliness (β = 0.6247, p < 0.0001) resulted significant predictors of higher loneliness at T1 (see Table T6).

Table T6. Final model for UCLA including postpartum predictors and psychological outcomes at T0 (square-root transformed)

Variable	Estimate	Std. Error	p-value
Intercept	17.8929	3.4325	<0.0001

Variable	Estimate	Std. Error	p-value
Breastfeeding experience_emotional = positive	-4.2309	1.4202	0.0041
UCLA T0	0.6247	0.0723	<0.0001

3.3.5. PBQ Postnatal Bonding

Difficulties in maternal–infant bonding measured with the Postpartum Bonding Questionnaire (PBQ) had a mean score of 11.6 (SD = 10.52) . In terms of clinical categories, according to the cut-offs, 86% of participants were in the normal range (< 26), 13% showed scores indicative of a bonding disorder (≥ 26), and 1.4% in the severe disorder range (≥ 40) (Brockington et al., 2001). No significant differences were observed between women who conceived spontaneously and those who conceived through assisted reproductive techniques (M = 10.75, SD = 9.60 vs. M = 13.65, SD = 12.59; $p = 0.4270$).

Correlational analyses (full matrix in Supplementary Table S2) showed that PBQ scores at T1 were positively associated with trait anxiety, state anxiety, pregnancy-related worries, loneliness, and maternal–fetal attachment quality measured at T0, and negatively associated with maternal–fetal attachment intensity.

Regarding the multivariate regression models conducted on the entire sample and including postpartum factors, neonatal complications ($\beta = –0.2798$, $p = 0.0303$) and negative or neutral breastfeeding emotional experience ($\beta = –0.3317$, $p = 0.0018$) were associated with higher PBQ scores at T1 (see Table T7).

Table T7. Final model for PBQ including only postpartum predictors (log transformed)

	Estimate	Std. Error	p-value
Intercept	0.4609	0.0889	<0.0001
Neonatal complications	-0.2798	0.1262	0.0303
Breastfeeding experience_emotional = positive	-0.3317	0.1014	0.0018

When prenatal psychological variables were added to the model, experience related to breastfeeding (β = –0.1977, $p = 0.0304$), higher trait anxiety at T0 (β = 0.0164, $p = 0.0005$), and higher maternal–fetal attachment quality (β = 0.0578, $p = 0.0018$) resulted significant predictors of post-natal bonding scores at T1 (see Table T8).

Table T8. Final model for PBQ including postpartum predictors and psychological outcomes at T0 (log transformed)

Variable	Estimate	Std. Error	p-value
Intercept	-1.8454	0.5106	0.0006
Breastfeeding experience_emotional = positive	-0.1977	0.0892	0.0304
STAI-Y – Trait anxiety T0	0.0164	0.0044	0.0005
MAAS_Quality T0	0.0578	0.0177	0.0018

3.4. Discussion

This study represents the second phase (T1) of the *Maternal Well-Being Project*, conducted six months after the baseline assessment (T0). The aim was to investigate maternal psychological well-being in the postpartum period and to identify potential changes compared to the third trimester of pregnancy. In addition, the study examined predictive factors of maternal mental health after childbirth, considering both sociodemographic and contextual factors related to childbirth as well as psychological variables assessed at T0 and T1. Moreover, the potential influence of the mode of conception (ART vs. spontaneous) was taken into account.

Six months after T0, 74% of women reported low levels of anxiety, while 26% showed at least moderate symptomatology, a pattern consistent with previous research indicating that a subset of women remains vulnerable to postpartum anxiety (Dennis et al., 2017; Araji et al., 2020). Compared to pregnancy, state anxiety levels significantly decreased from T0 to T1, in line with longitudinal studies suggesting that anxiety tends to decline after childbirth, likely reflecting the resolution of pregnancy-specific worries and the transition to a different set of stressors (Araji et al., 2020). However, the presence of moderate to high symptom levels in a relevant minority of women after childbirth is a clinically meaningful finding that warrants careful attention, as it may signal persistent vulnerability and the need for ongoing monitoring and support during the postpartum period.

With regard to depression, 57% of participants reported low levels, whereas 43% experienced at least moderate depressive symptoms at T1. Moreover, depressive symptoms significantly increased from T0 to T1, consistent with the well-documented postpartum peak in depressive symptomatology (Liu et al., 2022; Al-Abri et al., 2023). This rise may reflect the emotional and practical challenges of the postpartum adjustment phase, including hormonal changes, sleep deprivation, and caregiving demands.

At the same time, 74% of the women reported at least moderate levels of loneliness, with only 26% of participants reporting low levels. This finding underscores the importance of perceived social disconnection as a relevant psychosocial dimension during the perinatal period (Kent-Marvick et al., 2022). Unlike anxiety and depression, loneliness levels remained stable between T0 and T1, suggesting that social disconnection may represent a more stable and enduring psychological experience across the transition from pregnancy to early motherhood (Kent-Marvick et al., 2022).

Regarding postnatal bonding, 86% of the sample was within the normal range, while 13% reported clinically relevant bonding difficulties, and 1.4% met criteria for severe bonding disorder. Although this represents a minority, such difficulties should be carefully considered, as early disruptions in bonding are associated with adverse long-term child outcomes and parenting challenges (Rusanen et al., 2024).

Finally, no significant differences were observed between women who conceived through ART and those who conceived spontaneously across any of the psychological outcomes at T1, mirroring the pattern already observed during pregnancy (T0). These findings are consistent with previous studies suggesting that the emotional burden of ART is most pronounced during conception and early pregnancy, and may decrease over time as pregnancy progresses and stabilizes (Koukopoulos et al., 2020; Furmli et al., 2019; Galbally et al., 2024). However, a non-significant trend toward higher anxiety scores was found in the ART group ($p = 0.07$). Although not statistically significant, this trend should not be disregarded, as conception through ART emerged as a significant predictor of higher postpartum anxiety in the regression models, highlighting the potential presence of specific emotional vulnerabilities in this subgroup that may warrant targeted clinical monitoring and support (Zargar et al., 2023; Yoshimasu et al., 2020).

Regarding the predictive factors, consistent with the baseline findings, both stable individual vulnerabilities and postpartum contextual resources and stressors emerged as significant predictors of emotional adjustment at T1, alongside psychological variables measured at T0.

Across the different models, our findings highlight that, besides aforementioned conceive through ART, immature defense mechanisms, neonatal complications, trait anxiety, pregnancy-related anxiety regarding body appearance, and the quality of maternal antenatal attachment measured at T0 emerged as risk factors for postpartum mental health. In contrast, perceived partner support, support from healthcare staff, mature defense mechanisms, and a positive breastfeeding experience were identified as protective factors.

Specifically, concerns about body appearance during pregnancy seemed to predict postpartum anxiety levels. These concerns may not merely reflect aesthetic preoccupations but rather express broader difficulties in adapting to the bodily and identity transformations inherent to motherhood, thereby increasing vulnerability to postpartum distress (Dryer et al., 2020). At the same time, immature defenses measured during pregnancy were associated with higher postpartum anxiety, supporting the idea that defensive functioning reflects relatively enduring patterns of emotion regulation that can influence how individuals cope with stress during major life transitions such as motherhood (Porcerelli et al., 2022). This finding is consistent with recent studies highlighting how defensive functioning can shape how mothers experience and respond to psychological challenges in the perinatal period (Carone et al., 2025).

Moreover, higher antenatal attachment quality predicted greater bonding difficulties at T1. This finding runs counter to most prior work, which typically finds that stronger prenatal attachment relates to better postnatal bonding (Petri et al., 2018; Henrichs et al., 2023). A plausible interpretation is that that strong prenatal attachment can reflect intense emotional investment, potentially amplifying vulnerability when postnatal experiences diverge from expectations (Condon & Corkindale, 1993). At the same time, trait anxiety measured during pregnancy and

neonatal complications also predicted postpartum bonding difficulties. Elevated trait anxiety has been linked to heightened vigilance and rumination, which may interfere with the early relational process and contribute to less optimal bonding experiences (Henrichs et al., 2023). Regarding neonatal complications, consistent with previous research, such events could increase maternal stress and disrupt the early establishment of emotional attunement (Tichelman et al., 2019).

Interestingly but not surprisingly, emotional difficulties reported during pregnancy tended to persist over time. Specifically, higher levels of state anxiety, depressive symptoms, and loneliness at T0 were associated with higher levels of the same symptoms six months later. These associations suggest that emotional vulnerability during pregnancy may set the stage for postpartum adjustment (Huizink et al., 2017; Luciano et al., 2022). Clinically, this highlights the importance of early detection and monitoring, even when symptoms are not yet severe.

On the other hand, several protective factors emerged, helping to buffer emotional distress and support maternal adjustment in the postpartum period. Among these, partner support played a central role, showing a significant association with lower levels of loneliness, anxiety, and depressive symptoms at T1. This is consistent with previous studies highlighting the importance of close, supportive relationships in mitigating perinatal distress and promoting psychological well-being (Antoniou et al., 2021). A supportive partner can provide emotional reassurance, a sense of security, and practical help during the transition to parenthood, all of which can help reduce emotional burden.

Similarly, perceived support from healthcare staff was associated with lower anxiety and loneliness levels. This suggests that the quality of the relationship with professionals can represent a meaningful protective resource in the postpartum period, particularly in the early adjustment phase. Feeling listened to, supported, and cared for can strengthen mothers' sense of safety and reduce feelings of isolation (Coates et al., 2019).

Moreover, mature defense mechanisms assessed during pregnancy emerged as a protective factor for postpartum anxiety and depression symptoms. More adaptive defensive functioning can facilitate emotion regulation and coping with stress, helping mothers to navigate the challenges of the perinatal period with greater flexibility and resilience (Carone et al., 2025).

Finally, a positive emotional experience related to breastfeeding was associated with reduced loneliness, lower anxiety levels, and fewer bonding difficulties. This finding aligns with existing literature suggesting that, when experienced positively, breastfeeding can serve as a meaningful relational experience that supports maternal well-being and strengthens the mother–infant bond (Modak et al., 2023). Nonetheless, bonding and emotional adjustment can also be fostered through multiple caregiving experiences beyond breastfeeding alone (Hairston et al., 2019).

3.5. Conclusion

Taken together, the findings of this study highlight how maternal psychological well-being in the perinatal period emerges from the interplay between enduring individual characteristics, contextual resources, and specific perinatal experiences. Although average levels of anxiety, depression, and bonding difficulties remained below clinical thresholds, a considerable proportion of women experienced at least moderate emotional distress, particularly in terms of loneliness. This dimension represents a clinically relevant aspect that should not be overlooked in perinatal mental health care.

Importantly, the fact that anxiety, depression, and loneliness tend to predict their postpartum counterparts suggests that early emotional vulnerabilities tend to persist over time, exerting a longitudinal impact on maternal mental health. This underscores the importance of identifying at-risk women during pregnancy, particularly those presenting with subthreshold symptoms, so that preventive interventions can be implemented before symptoms escalate. Furthermore,

bonding difficulties were primarily predicted by prenatal emotional states (such as trait anxiety and antenatal attachment quality) and by postnatal neonatal complications, pointing to a dual pathway involving both individual and medical-contextual risk dimensions. Notably, conception through ART, while not associated with overall higher distress at T1, emerged as a significant predictor of postpartum anxiety, suggesting the presence of specific emotional vulnerabilities in this subgroup that may warrant targeted monitoring and support.

From a clinical perspective, these results emphasize the need for timely and targeted mental health screening during pregnancy and the postpartum period. Strengthening protective factors—such as perceived partner and healthcare support and adaptive emotion regulation strategies—may buffer emotional distress and promote more resilient maternal adjustment. Interventions aimed at enhancing maternal–fetal attachment during pregnancy may offer additional benefits for postnatal bonding and maternal well-being.

Future studies with larger and more heterogeneous samples, and multiple follow-up assessments, will be essential to better understand these trajectories, clarify group-specific dynamics, and inform more targeted and flexible clinical interventions. Strengthening this knowledge may ultimately support the development of timely screening protocols and early intervention strategies in perinatal care settings, promoting maternal mental health and fostering healthy early parent–infant relationships.

4. Negotiating Fatherhood: A Qualitative Study of Paternal Experiences in the NICU

4.1. Introduction

The perinatal period is a time of profound transformation, in which men and women alike are called to construct their identities as parents, a transition that is actively made rather than simply inherited. Parenthood, therefore, is not merely a biological fact but a relational and symbolic process, built through daily interactions with the infant, the partner, and the social and institutional environment (Tambelli et al., 2025). For fathers, this journey can be especially complex. While contemporary cultural models increasingly value paternal involvement, men often face persistent social and gender role expectations that position them as secondary caregivers, privileging maternal primacy and reinforcing ideals of stoicism and emotional restraint (Cabrera et al., 2018; Watkins et al., 2024). Such tensions make fatherhood a process of identity construction that requires negotiation, recognition, and participation in everyday caregiving (Tambelli et al., 2025).

When birth is premature and infants require admission to a Neonatal Intensive Care Unit (NICU), this fragile transition is further disrupted (Schwartz et al., 2025). NICUs are highly medicalized environments, dominated by machines, alarms, and protocols, where parents encounter their newborns through incubators and monitors rather than through touch. In such settings, ordinary rituals of early bonding are delayed, parental roles are suspended, and the very experience of becoming a parent unfolds under the constant presence of medical uncertainty (Provenzi & Santoro, 2015; Yıldız & Besirik, 2025).

Unfortunately, preterm birth is far from rare, accounting for more than one in ten live births worldwide—an estimated 13.4 million babies in 2020 (Darmstadt et al., 2023)—and for about 6.3% of births in Italy (CeDAP, 2023). Although hospitalization in the NICU is often essential to ensure survival and long-term health, it simultaneously exposes families to conditions that

challenge bonding, strain relationships, and disrupt the consolidation of parental identity—even in the absence of severe clinical complications (Schwartz et al., 2025).

Historically, research and clinical practice in neonatal care have focused predominantly on mothers, reflecting cultural assumptions that privilege maternal caregiving. Fathers have often been relegated to peripheral or supportive roles, leading to a limited understanding of their lived experiences during this highly stressful period (Provenzi & Santoro, 2015; Adama et al., 2025; Webber et al., 2025).

Quantitative research consistently shows elevated rates of psychological distress in this population, highlighting the clinical significance of paternal mental health during the neonatal period. Approximately one in four fathers report clinically relevant anxiety (≈26%; Shetty et al., 2024), around one in ten report depressive symptoms (≈12%; Shetty et al., 2024), and up to one third experience trauma-related stress during hospitalization (≈33% Laccetta et al., 2023). Some studies document even higher rates in the first week after birth, with depressive symptoms exceeding 60% (van Wyk et al., 2024). These figures, which vary according to timing and measurement tools, highlight the clinical relevance of paternal well-being in neonatal contexts and the need to recognize fathers as a population at increased psychosocial risk (van Wyk et al., 2024).

In parallel, a growing body of evidence shows that paternal involvement supports infant socioemotional and cognitive development (Lazarus et al., 2024), enhances maternal well-being (Kim et al., 2020), and contributes to overall family adaptation (McCann et al., 2024). Despite these evidence and the spread of family-centered care (FCC) models, which view parents as integral partners, paternal participation remains fragile and uneven (Adama et al., 2025). Fathers continue to face barriers to presence, participation in daily care, and skin-to-skin contact (Hubbard et al., 2018; Schmid et al., 2024). These barriers are institutional, such as restrictive visiting policies or rigid protocols, but also structural and societal, such as limited parental leave

or cultural norms discouraging vulnerability (Kömürcü Akik & Gökçe İşbir, 2022; Webber et al., 2025; Adama et al., 2025).

Importantly, NICUs are not uniform settings. Beyond the medical complexity of infants, units differ substantially in how care is organized and in the opportunities they provide for parental inclusion. Access policies, the availability of family spaces, and staff attitudes toward parental presence differ across NICUs. In some contexts, open-access policies, parent rooms, and structured support programs enable fathers to remain close to their infants and to participate actively in caregiving (Darcy Mahoney et al., 2020; Itoshima et al., 2025). In others, restrictive visiting hours, lack of privacy, or limited staff engagement reduce fathers to peripheral figures, reinforcing feelings of exclusion (Buccione et al., 2024; Webber et al., 2025). Accordingly, review of FCC emphasizes how infrastructural constraints, organizational culture, and inconsistent communication continue to limit the effective inclusion of fathers in neonatal care (Aljawad et al., 2025).

This complexity calls for an ecological perspective. Paternal adaptation is shaped not only by individual resilience but also by the "level of care" that a unit is able and willing to provide, not only in clinical terms, but also in relational, organizational, and cultural dimensions.

Within this framework, over the past two decades, qualitative research has offered particularly rich insight into how fathers experience the NICU.

The qualitative literature consistently reveals that fathers report intense emotional turbulence—fear, uncertainty, helplessness, guilt, and ambivalence—frequently managed through emotional suppression in line with cultural expectations of stoicism (Dadkhahtehrani et al., 2018; Eriksson et al., 2024; Adama et al., 2025). These accounts underscore how the NICU is not only a medical setting but also a profoundly destabilizing environment, where fathers are confronted with feelings of impotence and unpredictability that deeply shape their adjustment and involvement (Eriksson et al., 2024; Dadkhahtehrani et al., 2018; Webber, 2025). At the same time, many describe resilience and even post-traumatic growth, recounting how the NICU

experience, though painful, ultimately deepened their sense of fatherhood and family commitment (Yin et al., 2024; Steyn et al., 2017).

A relevant theme in this body of work is the tension between fathers' desire for active caregiving and the institutional and cultural barriers that limit their involvement (Feeley et al., 2013; Itoshima et al., 2025; Webber et al., 2025). Many fathers report feeling positioned as peripheral, supporting mothers while struggling to affirm their own paternal role (Webber et al., 2025). Conversely, when staff invite fathers into caregiving and validate their role, men describe greater confidence, stronger bonding, and enhanced well-being (Stefana et al., 2024; Buek et al., 2021; Adama et al., 2025). Exclusion, lack of information, or rigid protocols, by contrast, fuel distress and alienation (Stefana et al., 2024; Dadkhahtehrani et al., 2018; Adama et al., 2025).

Support systems have also emerged as pivotal in qualitative accounts. Peer-based father groups, family-integrated care models, and participatory interventions reduce isolation, promote recognition, and enhance coping (Lægteskov et al., 2023; Tiryaki et al., 2024). These resources are especially critical where limited paternity leave, stigma, or resource constraints undermine fathers' ability to participate fully (Hassan et al., 2025; Lægteskov et al., 2023).

Importantly, qualitative evidence underscores that fathers' experiences in the NICU are profoundly shaped by cultural and institutional contexts, portraying fatherhood as an identity under construction—continuously negotiated in interaction with infants, mothers, healthcare professionals, and organizational structures—and highlighting the need for context-sensitive approaches to neonatal care (Kömürcü Akik & Gökçe İşbir, 2022; Webber et al., 2025).

Yet, despite growing recognition of these dynamics (Candelori et al., 2015; Stefana et al., 2018; 2022; 2024), no qualitative research has systematically examined how fathers' experiences vary across different NICU care contexts in Italy. Considering that paternal identity is shaped at the intersection of cultural models and organizational structures, understanding how different institutional ecologies foster or hinder paternal recognition is essential.

To address this gap, the present study explores the narratives of 47 Italian fathers whose preterm infants were hospitalized in NICUs across different care settings and regions of the country, from north to south. Through thematic analysis (Braun & Clarke, 2006) of in-depth interviews, it investigates how fathers experienced uncertainty, relational dynamics, and the construction of paternal identity, and how these processes were shaped by organizational and institutional contexts. By attending to both shared and care-level-specific patterns, this study aims to contribute to a more nuanced understanding of fatherhood in prematurity.

4.2. Methods

4.2.1. Study design and objectives

This qualitative study explored paternal experiences of preterm birth and subsequent hospitalization in Neonatal Intensive Care Units (NICUs) in Italy, with a specific focus on fathers' narratives during the NICU stay and in the immediate post-discharge period. The aim was to examine how fathers experienced uncertainty, relational dynamics, and identity construction in the context of prematurity, and to investigate how these experiences were shaped by the organization of neonatal care units.

4.2.2. Participants

The interviews were conducted between 2022 and 2025 and involved 47 fathers of preterm infants admitted to Italian NICUs. Inclusion criteria required that each participant had experienced the hospitalization of his preterm infant in a NICU in Italy, and had sufficient proficiency in Italian to engage in an in-depth qualitative interview. Fathers were recruited through multiple channels, including voluntary associations, healthcare professionals working in neonatal units, and dedicated online platforms (e.g., Facebook groups for parents of preterm infants).

The study was approved by the relevant institutional ethics committee (Prot. N. RM-2021-484). Participation was voluntary, with no compensation provided. All participants provided written informed consent prior to enrollment.

Sociodemographic and clinical data were collected through a structured background questionnaire completed prior to the interview. The questionnaire gathered information on paternal characteristics (e.g., age, education, occupation, parity) and infant characteristics (e.g., gestational age, birth weight, length of NICU stay). This allowed for a comprehensive description of both parental and neonatal profiles (see Table S1, for paternal characteristics; see Table S2 for infant characteristics).

4.2.3. Level of care classification

NICU care levels were categorized as low, medium, or high based on five key organizational features identified in the literature (Coughlin et al., 2009; Montirosso et al., 2012):

1. 24/7 parental access;
2. Possibility of performing kangaroo care;
3. Involvement in daily caregiving procedures;
4. Attention to neonatal pain control;
5. Environmental and infrastructural characteristics (space, noise, light, privacy)
6. Availability of psychological support.

Units offering fewer than three of these features were classified as low-level care, those offering three to four features as medium-level care, and those offering more than four as high-level care.

Additionally, it is important to note that some participants' experiences may have been influenced by COVID-19–related NICU access restrictions. In these circumstances, parents were asked to report any perceived differences in service delivery compared to the pre-

pandemic period. The level of care was assigned based on the services reported by participants as being available in their hospital unit (see Table S3, for NICUs with COVID-19 related restrictions).

To ensure balance across contexts, participants were recruited from hospitals representing different levels of neonatal care: 13 fathers from low-care units, 17 from medium-care units, and 17 from high-care units (see Table 1 for detailed participant distribution by level of care).

PARTICIPANTS	LEVEL OF CARE	REGIONS	NUMBER OF CHILDREN
N1	High	Piemonte	1st child
N2	Low	Marche	2nd child (twins)
N3	Medium	Veneto	1st child
N4	Medium	Campania	2nd child
N5	High	Piemonte	1st child
N6	High	Lombardia	1st child
N7	Low	Umbria	1st child
N8	Medium	Lazio	1st child
N9	Medium	Marche	1st child
N10	High	Lombardia	1st child
N11	Medium	Marche	1st child
N12	Medium	Veneto	1st child (triplets)
N13	High	Lombardia	2nd child
N14	High	Lombardia	2nd child
N15	Low	Emilia-Romagna	1st child (twins)
N16	Low	Campania	1st child
N17	Low	Lazio	2nd child
N18	Medium	Campania	1st child
N19	High	Lombardia	1st child
N20	Medium	Veneto	1st child

N21	Medium	Veneto	1st child
N22	High	Veneto	1st child
N23	High	Liguria	2nd child
N24	Medium	Lombardia	1st child
N25	Medium	Veneto	1st child
N26	High	Lombardia	1st child
N27	High	Lombardia	1st child
N28	Low	Emilia-Romagna	1st child (twins)
N29	Medium	Trentino-Alto Adige	1st child
N30	High	Lombardia	2nd child
N31	High	Emilia-Romagna	1st child (twins)
N32	Low	Sicilia	1st child
N33	Low	Puglia	1st child (twins)
N34	Low	Puglia	1st child
N35	Medium	Puglia	1st child
N36	Medium	Sardegna	1st child
N37	High	Lazio	2nd child (twins)
N38	Medium	Lombardia	2nd child
N39	High	Lombardia	1st child
N40	High	Liguria	1st child
N41	Medium	Sardegna	1st child
N42	Medium	Puglia	2nd child
N43	Low	Lazio	3rd child
N 44	Low	Puglia	1st child
N45	Low	Puglia	1st child
N46	Low	Lazio	1st child
N47	High	Lombardia	1st child (twins)

Table T1. Distribution of participants by NICU care level and region.

4.2.4. Procedure

Data were collected through in-depth semi-structured interviews conducted via Microsoft Teams. Each interview lasted approximately 90 minutes (min: 50 minutes; max: 2 hours and 20 minutes) and was video-recorded with participants' consent. The interviewers were specialized in perinatal mental health and had specific training and experience in conducting qualitative interviews. They had no prior relationship with the participants. Fathers were invited to narrate their experiences in their own words, while the interview guide provided open-ended prompts covering the following key thematic areas:

1. Family structure and organization;
2. Conception, including pregnancy planning and medically assisted reproduction;
3. Gestation and key turning points in the transition to parenthood;
4. Childbirth, including hospitalization and parents' attribution of the causes of preterm birth;
5. Neonatal intensive care unit (NICU) experience, focusing on main care dimensions identified in the literature (e.g., access, skin-to-skin, nutrition, pain control, unit characteristics, parental psychological support);
6. Expectations regarding the child and fatherhood.

Interviews were transcribed verbatim. To ensure credibility and accuracy, transcripts were returned to participants for feedback. Five participants did not provide feedback despite follow-up contact. All data were anonymized, and pseudonyms were used throughout the analysis.
The present analysis specifically focused on experiences related to NICU hospitalization and the immediate post-NICU period. Themes unrelated to this focus (e.g., pregnancy or conception history) were not included in the present analysis.

See Appendix D for semi-structured interview guide used to explore participants' experiences and perspectives.

4.2.5. Data analysis

A thematic analysis was conducted following Braun and Clarke's six-phase model (2006; 2012) to identify thematic patterns within the data. The analysis was approached from a critical perspective, which considers language as constructing social realities shaped by cultural, linguistic, and social factors operating within the material world (Braun & Clarke 2006; 2012). In phase 1 (familiarization with the data), the authors read all interview transcripts multiple times to identify concepts, linguistic expressions, and meaningful units relevant to the research aims. Observations and analytical notes were systematically documented and served as the basis for subsequent steps. In phase 2, a manual coding process was conducted across the entire dataset. Extracts relevant to each code were collected, and a preliminary coding frame was developed. Coding proceeded iteratively, with attention both to recurrent patterns and to divergent or context-specific experiences. In phase 3, the authors organized codes into themes and subthemes by clustering similar and related content. A graphic thematic map was used to support the organization and refinement of emerging patterns. In phase 4, themes were reviewed and refined through multiple rounds of discussion within the research team to ensure both internal homogeneity and external heterogeneity, as well as consistency between coded extracts and the overall dataset. In phase 5, the final names and definitions of themes were established. In phase 6, illustrative extracts were selected, and the results were structured for reporting.

Special consideration was given to how themes manifested across different levels of care. Codes and themes were first examined within each group (low-, medium-, and high-care NICUs) and subsequently compared across groups to identify shared and care-level-specific patterns. This allowed for both transversal and contextualized interpretations of paternal narratives. To

enhance reflexivity and analytic rigor, the coding process was conducted by multiple researchers with expertise in perinatal mental health, who engaged in regular meetings to discuss coding decisions, emerging interpretations, and potential biases. Discrepancies were resolved through discussion and consensus. Reflexive notes were used throughout the analytic process to monitor researchers' assumptions and emotional positioning in relation to the data. In addition, triangulation within the research team supported the credibility and reliability of the thematic structure.

4.3. Results

Theme	Sub-theme	Illustrative quotes
1. Navigating the NICU: Between Uncertainty and Powerlessness	Between Limbo and War: First Steps into the NICU	"You live in limbo… whether the next day at the hospital went well overnight, whether there were complications" (P7 – low care)
	Powerless Witnesses	"You are helpless, you are a spectator, watching what others do" (P21 – medium care)
	Holding On: Individual Coping Amid Powerlessness	"Looking at the monitors gives me, perhaps, an illusion of control" (P42 – medium care);
2. Relationships in the NICU: Between Care and Connection	"We Became Part of Something": Trust and Humanity in the NICU	"We actually found a family, especially in the NICU. Everyone there has such a level of humanity in that ward" (P22 – high care)
	Words that Contain, Words that Wound	"At that moment you simply need a bit of comfort, calm eyes, a smile" (P44 – low care).
	"The Children Were Everyone's Children": Peer Solidarity	"My son—but all the other children—were everyone's children" (P45 – low care).
3. Fatherhood in the NICU: Negotiating Identity and Role	"Not the Baby I Had Imagined": Shattered Expectations	"…a little bundle of 945 grams, completely red, submerged in tubes with a mask on his face that was bigger than his face" (P31 – high care)
	"I Felt Like a Kind of Accident There": Barriers to Access	"There was the strong perception that our place was there with him, but instead we could see him at most an hour a day" (P43 – low care).
	"Half a Father": Struggling to Build a Paternal Identity	"…half a father…I can't hold you in my arms and I can't cuddle you and you're surrounded by monitors… these things sanction what birth usually is of a child… and these things weren't there" (P42 – medium care)
	The Long Shadow of the NICU: Worries About the Future	"I live in a state of hyperactivation, of constant attention to the baby's needs" (P26 – high care).

Table T2. Overview of themes, subthemes, and exemplar quotes

4.3.1. Theme 1- Navigating the NICU: Between Uncertainty and Powerlessness

The first theme captures how fathers experienced the NICU as a profoundly destabilizing environment, in which uncertainty, powerlessness, and the search for coping strategies were deeply interwoven. Their narratives convey the shock of being "catapulted" into an unfamiliar world, the frustration of being relegated to passive spectators, and the fragile efforts to regain a sense of agency and endure emotional strain. The following subthemes explore these three interconnected dimensions of fathers' experiences: entering the NICU as an unknown and unsettling world, living with the sense of being powerless witnesses, and developing strategies to hold on in an uncontrollable reality.

Sub-theme 1: Between Limbo and War: First Steps into the NICU

For most fathers, the first encounter with the NICU was experienced as a sudden rupture from everyday life, akin to being *"*catapulted*"* into an unfamiliar and overwhelming world. This entry was marked by disorientation and emotional shock: *"*I went down to the NICU, and that evening, that night, a whole world opened up*"* (P5 – high care); *"*I still had to be catapulted into this new world… it's a new world*"* (P4 – medium care). One father vividly recalled: *"*It was a nightmare… seeing all these babies in incubators, attached to tubes, wires, alarms going off. And it was also dark, it was evening, so it was even more impactful*"* (P10 – high care).

Across interviews, fathers consistently described the NICU as a place permeated by uncertainty. Initially, this uncertainty was tied to the very possibility of survival: *"*I didn't know if it would turn out well*"* (P6 – high care). Over time, it extended to the everyday trajectory of hospitalization, marked by unpredictable advances and setbacks: *"*Some days went well, some days instead were… you'd take one step forward and ten back*"* (P21 – medium care); *"*We were on a rollercoaster between one positive day, and another where… there was an infection, the baby was very unwell*"* (P37 – high care).

The experience of uncertainty was closely linked to fathers' emotional strain and fears of loss. Some recalled the exhaustion of prolonged stays with no clear progress: *"*It seemed like you could never take that step closer to discharge or to improvement*"* (P8 – medium care). Others remembered living with the nightly fear that their baby might not survive: *"*And the question was obviously: 'Do you see the possibility that she might die tonight?*"* (P26 – high care).

In fathers' words, the NICU appeared as a demanding and all-encompassing journey, requiring constant resilience: "The intensive care unit was a long journey, a long, exhausting path where every single day you really had to find the strength just to get through the day" (P29 – medium care). Some went further, describing it as profoundly destabilizing and threatening to their sense of self: "It shatters you as a person, it takes away all your certainties, it destroys you, you're no longer the same… The first week, the first 10 days, I cried continuously… I basically spent the day crying" (P26 – high care).

To make sense of this reality, fathers often relied on evocative metaphors. The NICU was described as a *"*limbo*"*, a suspended state of waiting:

*"*You live in limbo. I mean, you wake up in the morning and go to bed at night with that thought and that feeling—whether the next day at the hospital went well overnight, whether there were complications, whether we managed to get through the night. Because when you talk to them at the hospital, it's about days: 'let's see how it goes, today you are here, tomorrow maybe you are not'*"* (P7 – low care).

Others compared it to a *"*war*"*, where each day was a battle until discharge finally arrived (P41 – medium care). These metaphors captured a shared perception of the NICU as a space of struggle and unpredictability, experienced similarly across different levels of care.

Subtheme 2. Powerless Witnesses

Closely intertwined with uncertainty, one of the most pervasive experiences reported by fathers was a deep sense of powerlessness. Although some participants recalled a similar feeling during childbirth, it was particularly during the early stages of hospitalization that this sense of impotence became most pronounced. In those first days, fathers emphasized the impossibility of intervening in their child's care, recounting moments when they could only stand by as spectators: "Sometimes Vincenzo was crying and not only I couldn't hold him, but at the beginning he was so small that even the staff couldn't hold him. And that baby there crying, and you're just there… it's a bit tough from a human point of view" (P45 – low care).

Several accounts stressed this enforced passivity, where paternal presence was reduced to observing others act: "Also because you are helpless, you are a spectator, watching what others do, watching the baby, and hoping for the best. You can't do anything else" (P21 – medium care). Similarly, the NICU was experienced as an arena where paternal presence had little tangible effect: "That's why, I repeat, in that moment you are nothing, I mean, you just have to wait and see what happens, because… more than what you have already done, you can't do" (P44 – low care).

Restrictions and medical protocols often reinforced this perception, limiting fathers' opportunities for contact and amplifying the distance from their child's care. In these situations, fathers reported that their role was defined less by active participation and more by endurance, waiting, and hope: "… it wasn't something that depended on me, it wasn't something—I mean, the only thing I could do was be patient" (P46 – low care).

Subtheme 3. Holding On: Individual Coping Amid Powerlessness

In the destabilizing reality of the NICU, fathers sought ways to endure the pervasive sense of uncertainty and powerlessness. One recurring strategy was the attempt to gain an illusion of control, often by monitoring biomedical parameters. Observing numbers on the screen became a form of ritual that provided temporary reassurance: "At first, at the first beep-beep you'd say

‘doctor, nurse,’ right? Then you learn to understand that it’s not always something so serious, and yes, looking at the monitors gives me, perhaps, an illusion of control” (P42 – medium care). Similarly, some fathers described creating small routines around blood test results or scheduled visits, which offered a fragile but important sense of predictability: “That was certainly the difference in terms of control… you had direct and immediate feedback because you had the freedom to go” (P23 – high care). When opportunities for physical contact were possible, even brief moments of holding or touching the infant were imbued with meaning: “And there you feel you can do something, that you are a bit helpful… even just holding her, giving her all the positive energy you can” (P25 – medium care). These accounts also suggest that greater opportunities for contact—more typical of medium- and high-level NICUs—contributed to alleviating the sense of passivity.

Beyond physical presence, fathers activated different coping strategies to endure emotional fatigue. For some, distancing strategies such as focusing on work or everyday activities provided essential respite: “It’s an emotional fatigue… sometimes I stayed a little longer in the office, just to have that half-hour to recharge a bit” (P42 – medium care). Others relied on emotional closure and the decision to avoid thinking too far ahead, preferring to live “day by day”: “If I stop to think about it, I get overwhelmed, so I realized the best tactic is not to think about it and to allow myself to live day by day what happens” (P46 – low care).

Faith, trust in healthcare professionals, and references to destiny also emerged as important anchors. These were not perceived as forms of control, but as external sources of reassurance in an uncontrollable situation: *“*Faith, you see, I don’t know if it helped me materially, but it was a support, it was a support, we prayed*”* (P28 – low care); “I knew I was in the hands partly of the doctors, partly of destiny” (P42 – medium care).

Finally, some fathers described taking on the role of emotional support for their partners, often concealing their own worries in order to protect the mother from additional distress. This pattern can be understood both as a form of relational coping and as a defensive process akin to displacement, whereby emotional tension is redirected away from the self and focused on supporting the partner. While this stance may help maintain relational stability, it appears to entail an additional emotional burden, as fathers reported suppressing their own fears to remain reassuring: *"*My behavioral and psychological guideline in those moments was aimed at serenity and calm first and foremost for my wife… masking my inner emotional state to reassure her*"* (P45 – low care).

4.3.2. Theme 2- Relationships in the NICU: Between Care and Connection

While fathers experienced the NICU as a place of uncertainty and powerlessness, they also described it as a relational space, where bonds could mitigate distress and foster resilience. The presence and humanity of healthcare professionals often transformed the ward into more than a clinical environment, while communication emerged as a powerful form of both informational and emotional support. Alongside these vertical relationships, fathers also highlighted the solidarity built with other parents, a source of comfort and recognition that only those sharing the same experience could provide. Together, these accounts reveal the NICU as a setting where medical care and human connection were deeply intertwined.

Subtheme 1 - "We Became Part of Something": Trust and Humanity in the NICU

One of the most salient aspects of fathers' accounts concerned the centrality of healthcare professionals in shaping their NICU experience. Far from being perceived only as providers of clinical care, staff were often described as emotional anchors and figures of trust, whose presence helped fathers endure the uncertainty of hospitalization.

Fathers frequently emphasized the professionalism and availability of the staff, often contrasting it with experiences in other hospital wards: “There is calm and professionalism because you can notice a different kind of attention compared to other wards as well” (42 – medium care); “Always available, even at night when we called because we were worried, they answered and put the doctor on the phone, talked to us, at any hour, whenever you wanted, basically” (22 – high care). Such encounters fostered feelings of reassurance and gratitude: “I will always be grateful to everyone in the NICU… the doctors were all nice, the nurses were all nice, even the psychologist who took us in charge” (26 – high care).

Beyond clinical competence, fathers valued the empathy of staff, which often transformed the ward into a space of belonging and care for parents as well as for infants: “We actually found a family, especially in the NICU. Everyone there has such a level of humanity in that ward. Before we were a number; there we became part of something” (22 – high care). Several fathers recalled being “pampered,” reassured, and welcomed, experiences that mitigated distress and softened the harshness of the setting (30 – high care).

These bonds were sometimes described in highly personal terms, facilitated particularly in high-care units where parents could spend extended time in the ward. Some fathers recounted building genuine relationships with staff, learning about their lives beyond the NICU: “I could really get to know the people behind the white coat… a relationship with people was really established” (30 – high care). In some cases, these relationships continued after discharge.

The depth of this connection was reflected in affectionate nicknames, such as “the aunts” for nurses or “the village chief” for a doctor remembered for his distinct style of communication (30 – high care; 47 – high care). Healthcare professionals became “guardian angels” (47 – high care) entrusted with both the survival of their children and the emotional holding of families.

At the same time, some fathers—especially in low-care settings—pointed to the limits of this support. As one recalled: *"*They were all kind on a human level… But they focused on saving the children's lives; they did not also focus on the quality of their life. So, unfortunately, we paid a high price for this… Both could have been done; both should have been done*"* (43 – low care).

Subtheme 2 –Words that Contain, Words that Wound

If trust and human connection represented the emotional groundwork of fathers' NICU experience, communication represented the concrete way in which this sense of connection and support was conveyed in everyday interactions. Fathers' accounts highlighted how words could either soothe and sustain them, or, conversely, deepen their sense of isolation.

When communication was attentive and empathetic, it acted as a powerful form of dual support—providing both information and emotional containment. Fathers valued staff's readiness to listen and respond to their questions, even on minor issues: "They always listened to you—even to some of your doubts… they always answered appropriately and also politely" (39 – high care). For many, calm and reassuring communication played a crucial role in alleviating their anxiety: "All the staff, the doctors, were very, very serene, very calm—they did not add anxiety or concern to what I already had" (10 – high care). Even apparently trivial details became profoundly meaningful when shared with sensitivity: "While I was leaving, a doctor told me, 'Ah, by the way, she peed today.' It's really a triviality, right? And yet this gives you strength; it helps you say, 'Oh, let's put a positive point; tomorrow I'll put another one, and then another'" (42 – medium care).

Fathers also underscored how communicative gestures of encouragement fostered their involvement in care. As one explained: "There were those who were more present, who on entering would immediately greet you and say, 'Hi dad, if you need a hand, tell me'… If you

said, ‘No, I’ll do it myself,’ they respected that; maybe they would watch you from a distance, but they respected it. In that case I felt calm… Elsewhere there were teams a bit more—mmm—where you go in and they don’t pay much attention to you. So this is a human element that is important; it would have made a difference at certain times to have someone there” (27 – high care).

Yet fathers were equally clear that communication was uneven, depending strongly on individual professionals. Some were meticulous and empathetic, while others appeared distant: “Because someone is more inclined to involve you, someone else a bit less” (11 – medium care). Different communicative styles could even alter the emotional climate of the day: “There was one doctor who was perhaps pessimistic by nature… then there were another couple who lifted you up—a little word was enough, and the way they said it. In this, we were a bit burned out. Then, after three months, you start getting to know the doctors and you say, ‘He always says this; she sugarcoats it; he tells it raw’” (29 – medium care).

In contrast, when communication lacked empathy or excluded fathers from important aspects of care, it was remembered as a source of pain: “My wife asked, ‘When can we do kangaroo care?’ The answers were generally, ‘Well, there are still so many cables attached… it’s a bit stressful for the baby’” (23 – high care). For some, especially in low-care settings, the absence of sensitivity was stark: “At that moment you simply need a bit of comfort, calm eyes, a smile—not specific medical words” (44 – low care). Others noted that information often felt rationed, leaving them with the impression of being only partially informed: “Even information about the baby was rationed out… many times they told us obvious things that I had already guessed” (45 – low care).

Subtheme 3 – “The Children Were Everyone’s Children”: Peer Solidarity in the NICU

Support and comfort in the NICU did not come only from healthcare staff, but also from the bonds fathers established with other parents during hospitalization. In many accounts, the waiting rooms and ward corridors became places where a "second family" was formed, united by a shared vulnerability: "When there were serious situations, they would make you go out; we went to the waiting room, and there another family was created—that of the parents there with whom we basically shared joys and sorrows… I found a group of people, and I think that in these cases you have to come together to share these things and we really helped each other a lot" (37 – high care).

These relationships often transformed the NICU into a community where mutual exchange and encouragement alleviated the weight of daily uncertainty. Fathers spoke of solidarity that extended beyond their own child, creating a sense of collective responsibility: "My son—but all the other children—were everyone's children… we were all in the same boat, so we hoped that no one would have problems because the children were everyone's children" (45 – low care). For some, the intensity of these bonds was striking: "People I had never seen before, and never saw after, but in that moment they were my best friends; they were able to understand me and I was able to understand them, and no one else could enter this magical circle" (26 – high care).

Solidarity among parents, regardless of the level of care, was described as a form of communal coping, made possible by the unique understanding of those living through the same reality. Many fathers contrasted this with the difficulty of receiving adequate support from family and friends outside the hospital, who—however well-meaning—could not grasp the singular intensity of the NICU: "Those who haven't experienced such a situation will never be able to perceive it… what I needed there was to have someone who knew what I was talking about" (44 – low care). As another father put it: "It's impossible to describe if you haven't experienced it… only if you are the father and your child is there" (25 – medium care).

4.3.4. Theme 3. Fatherhood in the NICU: Negotiating Identity and Role

Fathers' experiences of uncertainty and powerlessness, together with the supportive or hindering relationships within the NICU, provide the backdrop against which paternal identity is negotiated. Prematurity disrupts expectations of a linear transition to parenthood, confronting fathers with fragile beginnings and limited opportunities for closeness. Within this context, they must make sense of their role—often marginal, sometimes unrecognized—while searching for ways to embody fatherhood. This negotiation unfolded through different stages: from the shock of first encounters, to barriers in recognition and access, to struggles of "feeling like a father," and finally into the post-NICU period, where fatigue and fears about the child's future could continue to shape fatherhood.

Subtheme 1 – "Not the Baby I Had Imagined": First Encounters and Shattered Expectations

For many fathers, the first meeting with their newborn was described as both emotionally overwhelming and profoundly destabilizing. Instead of the joyful and intimate moment they had envisioned, they were confronted with an image that contrasted sharply with expectations of a full-term birth: infants surrounded by machines, wires, and tubes. As one father recalled: "Ugly, objectively, it's not like you can imagine a baby or as you are used to seeing a baby… and I simply fainted… well, it had been a very strong emotion" (P43 – low care). Another described the painful impact of his first glimpse: "…seeing my little girls there so tiny, with more wires and tubes than anything else, that was really, perhaps the hardest part" (P10 – high care).

The physical appearance of the infant was frequently recounted in vivid detail, underscoring the shock of confronting a body that seemed fragile, unfamiliar, and almost unrecognizable: "The first bed arrived with the incubator on top, and there I saw my son for the first time… a

little bundle of 945 grams, completely red, submerged in tubes with a mask on his face that was bigger than his face" (P31 – high care).

This first encounter often amplified the rupture of parental expectations, producing a sense of emptiness and loss. For some, the absence of a "normal" homecoming magnified this gap: "That was the hard part because then, coming home, she had the belly, coming back without the belly but without the baby, it was a tremendous blow" (P5 – high care). Others expressed the disorientation of facing a reality that had not been anticipated: "I wasn't expecting it like that… I was expecting maybe premature, maybe low weight, but not like that" (P22 – high care).

The transcripts also reveal the longing for ordinary gestures of parenthood that were denied in this context. Fathers spoke of the inability to perform the simple rituals they had imagined, such as holding the baby skin-to-skin, resting together, or offering immediate comfort. As one explained: "Clearly you pictured it differently, right? When your child is born and you say, 'I'll put him on my belly and we'll lie down together, we'll nap'… these things you obviously couldn't do there, and so there's a bit of frustration about that" (P27 – high care).

Subtheme 2 – "I felt like A Kind of Accident There": Barriers to Access and Role Recognition

The rupture of expectations described at the first encounter was further compounded by the obstacles fathers encountered in accessing the NICU and having their role recognized. Narratives often contrasted experiences of open access, which fostered closeness, with settings where visits were restricted or heavily regulated. In high-care units, some fathers recalled the possibility of spending extended time with their infant, even sharing symbolic moments such as New Year's Eve in the ward "To celebrate our baby's first New Year" (P26 – high care).

By contrast, in units with highly restrictive policies—sometimes limiting fathers to a single hour per day—accounts conveyed frustration, marginalization, and an intensified sense of

powerlessness: “I could enter only at 6 p.m. every day, but only at 6, so I had access for one hour a day… it happened to me that I went at 6 p.m., there was a problem, and in the end we would get in for 5 minutes and then leave” (P45 – low care). Restrictions linked to the COVID-19 pandemic were described as especially incomprehensible, with some fathers perceiving them as unjustified: “There was the detachment, the strong perception that our place was there with him, but instead we could see him at most an hour a day… with COVID, for some strange reason, if you stay an hour it’s harder to bring it in than if you stay a few hours” (P43 – low care).

In such contexts, many fathers chose to leave their limited visiting time to the mother, reinforcing the idea that their presence was less central: “Naturally, I tried to leave as much space as possible to the mother, because babies need their mother at that moment, they need her warmth and smell” (P43 – low care). These structural barriers were compounded by practical ones, such as work commitments and caring for other children at home, which further limited opportunities for paternal involvement (P29 – medium care).

More broadly, several fathers perceived that while the infant and mother were central in the NICU, the father remained peripheral. This sense of marginality was not only the product of institutional arrangements, but also reflected the internalized cultural scripts that many fathers carried with them into the NICU. The organization of care, structured around these same normative logics, thus reinforced and legitimized them, reproducing a setting in which paternal roles remained secondary and narrowly defined: “One thing was clear: they focused on the baby, secondarily on the mother, which is right. But the father, at least I felt like a kind of accident there” (P41 – medium care). Yet, fathers also insisted that their presence was essential for the well-being of both child and partner: “It’s not just the mother, because the mother’s well-being also depends on having her partner present… birth and what comes after is a group matter” (P28 – low care).

Despite these accounts of exclusion, some hospitals did implement practices that recognized fathers as co-parents. Initiatives such as parent rooms before discharge or explicit encouragement of parental presence were highly valued: “They always said, ‘The more time you spend here, the sooner the baby will be discharged. Your presence is not irrelevant’” (P13 – high care).

Subtheme 3 – “Half a Father”: Struggling to Build a Paternal Identity

Prematurity not only disrupted expectations of childbirth, but also hindered the process of fathers’ identity formation. Several described the emotional dissonance of being thrust into parenthood prematurely, without the gradual preparation offered by pregnancy: “Those nine months are not only for the child… they also serve you to understand that you’re becoming a father” (P46 – low care). The NICU context, marked by machines and protocols, often amplified this disorientation: “What did I expect from being a parent? Certainly not to undergo intensive care… everything was new, difficult, nerve-racking, worrisome” (P12 – medium care).

The sense of incompleteness was poignantly expressed by a father who defined himself as “…half a father…I can’t hold you in my arms and I can’t cuddle you and you’re surrounded by monitors… these things sanction what birth usually is of a child… and these things weren’t there” (P42 – medium care). For others, paternal identity seemed to emerge only later, often after discharge, once daily life with the baby became possible: “Throughout pregnancy, birth, and the NICU I did not live my son… I became a father in a more intimate way later” (P16 – low care).

At the same time, fathers’ words highlight the transformative role of involvement in care practices. Feeding, diaper changing, and especially kangaroo care emerged as crucial opportunities to “feel like a father 100%”: “It was a beautiful emotion… skin-to-skin contact

for half an hour. The saturation levels rose immediately with me. It was wonderful, I felt like a father 100%" (P36 – medium care). For many, these moments were remembered as "magical," the most meaningful of the entire hospitalization (P27; P47 – high care).

When such opportunities were absent, fathers expressed a profound sense of exclusion: "I feel the absence of being able to hold her, to console her… there are gowns, disinfectants, monitors, everything you don't imagine when planning a pregnancy" (P42 – medium care). The lack of recognition was sometimes explicitly linked to a gendered division of care, where practices were centered almost exclusively on mothers: "They put her on her mother's chest… she said it was a beautiful experience… and I'd like to feel more like a father too" (P42 – medium care).

Subtheme 4 – The Long Shadow of the NICU: Fathers' Worries About the Future

The end of hospitalization did not mark a clean break with the NICU experience; instead, fathers described a long-lasting impact that extended into family life. Bringing the baby home was often experienced less as a moment of euphoria than as an overwhelming continuation of fatigue and worry: "When a full-term baby is born… you're pumped up, there's euphoria. When you leave an intensive care unit, you're exhausted, and so… we're still having difficulties afterwards. The after is also hard" (P29 – medium care).

A pervasive theme was hypervigilance, with fathers describing themselves as perpetually alert to possible problems: "I live in a state of hyperactivation, of constant attention to the baby's needs… the whole experience left me with a hyperattention to be sure there isn't something wrong" (P26 – high care). Even when children were thriving, apprehension lingered: "In terms of apprehension you're a bit more careful… but I can't tell you whether, had that experience not occurred, I would have been different" (P45 – low care).

Fathers often linked this anxiety to fears about their child's long-term health and development: "The worries I have the most are more projected into the future, that is, my uncertainty in case she has some problems—at the cognitive level" (P44 – low care). In some cases, this concern extended into broader life scenarios—adolescence, independence, or even external dangers. The sense of living "day by day" persisted after discharge: "I don't fully imagine him… I'm so focused on the day-to-day that I don't imagine him talking, walking, going to school. This whole difficult phase taught us to live day by day" (P36 – medium care).

This difficulty in imagining the future reflected the enduring uncertainty of prematurity, which for some fathers still overshadowed the joy of survival: "…who knows how he will survive. So it's more about in what condition" (P21 – medium care). For others, the awareness of how close they had come to loss remained a quiet but constant presence in everyday life: "Every time I think that he would have died… it was a series of random, fortunate events that led to having him" (P24 – medium care).

4.4. Dicusssion

Becoming a father in the context of a premature birth represents an experience suspended between fragility and transformation. The narratives collected in this study reveal how Italian fathers confronted the NICU as a space of rupture, a place where expectations of early parenthood collided with the realities of medical technology, uncertainty, and institutional boundaries. What emerged was not only a story of emotional strain but also of adaptation and meaning-making, in which fathers sought to reconstruct their sense of self and their role as parents within a setting that sometimes constrained their presence.

Three interconnected dimensions capture this process: the pervasive uncertainty and powerlessness that pervaded the first encounters with their infants, the relational dynamics that could either amplify distress or foster resilience, and the continuous negotiation of paternal identity throughout hospitalization and beyond. In this sense, the study extends previous

literature by highlighting the distinctive challenges faced by fathers and the contextual factors that shape their involvement (Webber et al., 2025).

The first theme “Navigating the NICU: Between Uncertainty and Powerlessness” illustrates how fathers navigated the NICU as an emotionally intense and unpredictable environment, where uncertainty and powerlessness were central yet not passively endured. Rather, fathers actively sought to construct meaning and regain a sense of agency through small acts of caregiving, faith, or emotional regulation.

The first encounter with the NICU was described as shocking and disorienting, a moment in which everyday expectations of early fatherhood were abruptly replaced by the unfamiliar rhythms and sensory intensity of the medical environment. The metaphors used by fathers—being “catapulted” into another world, “living in limbo,” or “fighting a war”—reflect the attempt to render intelligible an experience that defies ordinary meaning. Such symbolic language is consistent with previous studies showing that parents of preterm infants often use metaphor as a way to communicate the existential disruption and chronic uncertainty of neonatal hospitalization (Hearn et al., 2020; Lindberg et al., 2007; Merritt et al., 2022). This experience can be understood as a form of *biographical disruption* (Bury, 1982), in which the expected narrative of parenthood is interrupted by medical crisis and uncertainty. Within this framework, the NICU becomes a liminal space—a threshold between hope and fear, presence and absence—where the ordinary markers of time and progress are suspended, and where fathers must begin to reconstruct meaning in radically altered circumstances (Koliouli et al., 2016).

Uncertainty emerged as a defining and enduring feature of fathers’ narratives, regardless the levels of care. Initially centered on the infant’s survival, it soon expanded to encompass the unpredictable trajectory of hospitalization, the fragile alternation between progress and relapse, and the impossibility of anticipating discharge. Fathers described this as an emotional

"rollercoaster," echoing previous qualitative findings where the NICU is portrayed as a chronically unstable space of care (Yu et al., 2020; Adama et al., 2025). This uncertainty was not merely cognitive but profoundly embodied: fathers spoke of exhaustion and the constant fear of loss. Such experiences resonate with accounts of existential vulnerability in early parenthood under medicalized conditions, where uncertainty is experienced as a persistent and embodied condition that shapes daily parental presence, emotional regulation, and perceptions of control (Provenzi & Santoro, 2015; Aljawad et al., 2025; Almalki et al., 2025).

Closely tied to uncertainty was the pervasive sense of powerlessness. Despite their emotional investment, fathers frequently described themselves as spectators, standing beside the incubator while others, usually medical staff, took action. Similar findings have been reported in qualitative studies where fathers describe "standing on the sidelines," unable to fulfill their caregiving role (Spinelli et al., 2016; Merritt et al., 2022; Eriksson et al., 2024). This lack of agency was reinforced by structural and procedural barriers, conditions more typical of lower levels of care. In these settings restricted visiting hours, limited opportunities for touch, and the rigid organization of care seems to intensify the feelings of marginalization and powerlesseness. These differences echo recent evidence suggesting that parental access and participation are key determinants of perceived agency during neonatal hospitalization (Hearn et al., 2020).

Against this backdrop of uncertainty and powerlessness, fathers developed multiple strategies to "hold on" within an uncontrollable world. Some sought to regain a fragile sense of agency through observation and monitoring—watching biomedical parameters, learning the meaning of beeps, or establishing daily routines around test results. These practices mirror findings from previous studies describing how technical knowledge and familiarity with medical equipment can provide fathers with an "illusion of control" and a means to participate symbolically in their infant's care (Feeley et al., 2013; Yin et al., 2021). Others, in line with the literature, turned to emotion-focused coping: distancing themselves temporarily through work or small daily tasks, or adopting a "day-by-day" mindset to avoid emotional overwhelm (Yin et al., 2021). Faith,

trust in healthcare professionals, and reference to destiny often functioned as external anchors of meaning, reaffirming continuity in the face of chaos (Yin et al., 2021).

Notably, many fathers, in line with previous qualitative studies on paternal adjustment in the NICU (Merritt et al. 2022;Webber et al. 2025), described assuming a protective stance toward their partners, concealing their own distress to maintain a sense of stability for the family. Such strategies, while adaptive in the short term, can also hinder emotional processing and the visibility of paternal needs if not met with recognition and support (Stefana et al., 2021).

If uncertainty and powerlessness represented the backdrop of fathers' experiences in the NICU, relationships within the ward emerged as a decisive factor in mitigating—or at times amplifying—these challenges, as highlighted in the second theme *"*Relationships in the NICU: Between Care and Connection". Trust, communication, and solidarity were not peripheral but central aspects through which fathers endured the NICU journey and made sense of it.

Healthcare professionals were consistently described as emotional anchors whose competence and presence provided both reassurance and belonging. Beyond clinical expertise, fathers emphasized the value of humanity—small gestures of care, attentiveness, and recognition—that transformed the NICU from an impersonal medical space into a relational one. These findings echo evidence that relational warmth and continuity of care foster parental resilience and a sense of safety (Feeley et al., 2013; Modé et al., 2014; Provenzi & Santoro, 2015; Olsson et al., 2017). Particularly, in higher-care settings, where fathers could remain for longer periods, relationships with staff often evolved into genuine, reciprocal bonds, even extending beyond discharge. By contrast, in low-care settings, fathers often described relational exchanges as more limited, not necessarily due to a lack of humanity on the part of professionals, but because reduced time at the bedside and fewer opportunities for informal encounters made it harder to build sustained connections. In these contexts, the warmth of individual professionals sometimes struggled to compensate for structural constraints. Meanwhile, medium-care units often emerged as intermediate contexts in which the quality of relational culture mediated

structural limitations, allowing fathers to experience the NICU as more supportive despite organizational constraints. This aligns with evidence that humanization of care is sustained not only by physical environments but by relational practices and organizational ethos (Aljawad et al., 2025).

In this context, communication emerged as the everyday practice through which trust and inclusion were enacted. Attentive dialogue, calm tone, and small verbal gestures functioned as both informational and emotional regulation tools, helping fathers regain composure and sustain hope. Even minimal communicative acts—such as sharing a small positive update—became symbolic anchors of progress and connection. Consistent with recent studies, empathic communication is not merely the transmission of data but a relational act that co-regulates parental anxiety and constructs partnership (Modé et al., 2014; Olsson et al., 2017). However, fathers also highlighted variability across individuals and teams: inconsistent communication styles produced daily fluctuations in the emotional climate of the ward and could undermine fathers' sense of inclusion. Such disparities underline the need for structured, father-sensitive communication protocols that ensure emotional continuity across caregivers (Merritt et al., 2022; Eriksson et al., 2024).

Beyond staff, fathers highlighted the importance of peer solidarity. Informal bonds with other parents, often formed in waiting rooms and corridors, were described as a "second family" united by shared vulnerability. These relationships alleviated isolation and created a sense of communal coping: fathers felt that "the children were everyone's children," extending concern and hope beyond their own infants. Such accounts illustrate the protective role of peer support, which has been shown to normalize intense emotions, provide experiential validation, and foster resilience (Hearn et al., 2020; Koliouli et al., 2016; Yu et al., 2020). Fathers also contrasted the immediacy of peer solidarity with the inadequacy of support from family and friends outside the hospital, who—even if well-meaning—could not fully grasp the unique intensity of the NICU (Hearn et al., 2020). Importantly, unlike professional relationships that

varied across settings, peer networks emerged across high-, medium-, and low-care contexts, suggesting that communal solidarity probably represents a universal protective factor.

While relationships within the NICU played a crucial role in mitigating fathers' vulnerability, these emotional and relational dynamics unfolded within a broader process: the ongoing negotiation of what it means to be a father in this context. In this sense, the third theme, "Fatherhood in the NICU: Negotiating Identity and Role", captures the complex ways in which fathers make sense of their place in a space that both enables and constrains their involvement. The first encounter with the infant was described as a moment of rupture, marked by shock and disorientation. Instead of the anticipated intimacy, fathers were confronted with fragile and medicalized bodies, which destabilized both their image of the child and their imagined role as parents, a reaction well documented in the literature (Adama et al., 20205; Almalki et al., 2025). This gap between the "imagined baby" and the "real baby" evokes what the literature describes as a form of ambiguous loss, in which fathers grieve the absence of a "normal" birth and initiation into parenthood, even as they celebrate survival (Pauline & Boss, 2009). In the absence of expected rituals—such as immediate holding or skin-to-skin—fathers attempted to preserve meaning through small gestures, like watching or feeding, which became disproportionately significant in affirming their paternal role (Webber et al., 2025).

In this context, access policies emerged as a key determinant in shaping not only fathers' physical presence but also the symbolic legitimacy of their role. In units with open or flexible access, fathers described being able to remain close to their infants, participate in caregiving, and develop a sense of belonging within the ward—where their presence felt expected rather than negotiated. According to the literature, when staff used inclusive communication, created family-friendly spaces, and explicitly acknowledged fathers' presence, participants described feeling recognized as legitimate members of the caregiving team (Provenzi & Santoro, 2015; Stefana et al., 2022). Conversely, restrictive access—sometimes limited to a single hour—transformed proximity into a fragile privilege. Fathers reported frustration, marginalization, and

a stark sense of being an “accidental” participants in their child’s care. This aligns with qualitative evidence showing that constraints on visitation intensify parental stress, erode trust, and reinforce exclusion (Watkins et al., 2024; Webber et al., 2025). Moreover, during the COVID-19 pandemic, visitation limits further deepened this tension, compounding fathers’ struggle for proximity (Darcy Mahoney et al., 2020).

Similar dynamics have been observed in other qualitative studies, where fathers described how structural barriers undermined their involvement and positioned them as peripheral figures in neonatal care (Adama et al., 2025; Buek et al., 2021; Hugill et al., 2013). These institutional dynamics, however, often mirrored internalized cultural scripts that many fathers themselves shared, reproducing and legitimizing the very logics that constrained their participation (Hyden, 2023).

These structural limitations and the lack of role recognition had direct consequences for the process of paternal identity construction. Identity was not only imagined but embodied through concrete caregiving practices. Feeding, changing, and especially kangaroo care were experienced as pivotal moments, “magical” in their words, that affirmed their legitimacy as parents and allowed them to feel “100% fathers.” These gestures operated as acts of claiming fatherhood in an environment that otherwise positioned them at its margins (Feeley et al., 2013; Olsson et al., 2017; Mörelius et al., 2021). Conversely, when opportunities for such involvement were restricted paternal identity was experienced as incomplete, fragile, or suspended. The recurrent metaphor of being “half a father” reflects this sense of dissonance: fathers were present but unable to inhabit their role fully, reduced to spectators beside incubators and machines. This resonates with qualitative evidence highlighting how limited caregiving opportunities can delay paternal role internalization and amplify feelings of marginality (Merritt et al., 2022; Watkins et al., 2024).

Importantly, this marginal or subordinate positioning of fathers cannot be attributed solely to institutional constraints. Rather, it appears to be co-constructed through shared cultural

representations of parenthood that predate the NICU experience itself (Hyden, 2023). Many fathers entered the neonatal context already holding implicit assumptions about their role as secondary to the mother, particularly in relation to caregiving and emotional proximity to the infant. In this sense, NICU institutions did not merely impose marginalization from the outside, but often mirrored and legitimized culturally embedded gendered scripts that fathers themselves partially endorsed (Hyden, 2023). The organization of care, access policies, and communication practices thus materialized these shared assumptions, defining the concrete conditions within which fathers were allowed to act and recognize themselves as parents.

Crucially fathers' sense of identity did not emerge in a linear or predetermined way: rather, it was continuously negotiated through the interplay of pre-existing cultural expectations about fatherhood, opportunities for relational and caregiving involvement, and institutional practices regulating access, recognition, and participation within the NICU (Stefana et al., 2018; Provenzi & Santoro, 2015; Yildiz & Besirik, 2025).

Importantly, the NICU experience continued to reverberate well beyond discharge. For many, going home did not bring unambiguous relief but rather a continuation of fatigue and vigilance. Fathers described states of hyperactivation, monitoring for potential health issues and fearing long-term developmental difficulties. Even when infants thrived, anxiety lingered, constraining the capacity to imagine the child's future and reinforcing a "day-by-day" temporality. This long shadow of prematurity is consistent with previous studies linking early neonatal experiences to lasting parental hypervigilance and trauma responses (Hearn et al., 2020; Lebel, 2022).

Taken together, these findings suggest that becoming a father in the NICU involves negotiating identity under conditions of rupture, restricted access, and enduring uncertainty. Paternal adjustment was not determined solely by individual resilience but by institutional practices and cultural models of care. Policies that facilitate access, create caregiving opportunities, and explicitly recognize fathers as co-parents can transform fragmented experiences of "half a

father" into a more coherent and confident paternal identity, extending support not only within the NICU but also into the long shadow of post-discharge life.

4.4.1. Levels of Care

An original contribution of this study lies in the exploration of fathers' experiences across different levels of neonatal care, collected through interviews conducted throughout Italy. This methodological choice allowed us to capture how organizational resources and models of care intersected with paternal adjustment and identity formation in the NICU.

In high-care settings, fathers frequently described their presence as integrated and expected rather than negotiated. Open access policies, structured caregiving opportunities, and consistent communication with staff were identified as key enablers of active participation. Their narratives conveyed prolonged bedside presence, frequent skin-to-skin contact, and a sense of belonging within the ward. These structural features appear to support the process of paternal identity formation, enabling fathers to perceive themselves as legitimate members of the caregiving team rather than peripheral figures. This is consistent with evidence showing that family-centered organizational models, particularly those that promote unrestricted parental access and caregiving involvement, enhance parental engagement and psychological well-being (Aljawad et al., 2025). By contrast, low-care settings were often characterized by restrictive access policies and limited caregiving opportunities, which turned proximity into a fragile privilege rather than an assumed right. Fathers' involvement was more fragmented, mediated by rules, visiting schedules, or maternal presence, reinforcing feelings of marginality and powerlessness. Importantly, these patterns are not necessarily reflective of staff attitudes but rather of the structural and procedural constraints. These accounts echo existing evidence linking restricted parental access to increased psychological distress (Watkins et al., 2024; Merritt et al., 2022). Medium-care units emerged as intermediate contexts, where the relational

quality of care often compensated for structural limitations. Even in the presence of reduced access or infrastructural constraints, fathers highlighted the humanity and attentiveness of staff as key elements fostering trust and inclusion. This finding underscores the capacity of relational practices to buffer organizational shortcomings and shape paternal adjustment trajectories (Provenzi & Santoro, 2015; Aljawad et al., 2025).

Taken together, these findings underscore that levels of care function as structural determinants of paternal experience—shaping not only fathers' physical access to the infant but also the symbolic legitimacy of their role. Variability across units reflects what has been described as the "organizational ecology" of NICUs, where parental experiences are deeply influenced by a combination of policies, staff attitudes, relational ethos, and material resources (Merritt et al., 2022). Recognizing these differences is crucial to understanding fathers' adjustment as not merely an individual psychological trajectory, but as an outcome co-constructed through interactions with institutional contexts. By comparing paternal perspectives across high-, medium-, and low-care settings, this study illustrates how structural facilitators (such as open access and caregiving opportunities) and relational buffers (such as empathic communication and staff responsiveness) can transform the NICU from a place of marginalization into a space of belonging. Interventions that target these organizational dimensions—particularly in lower-resource settings—represent a key avenue for fostering equitable parental inclusion and supporting fathers throughout the neonatal journey.

4.4.2. Clinical and Practical Implications

The findings of this study underline the importance of recognizing fathers as active and essential participants in neonatal care. Prematurity can profoundly disrupt the early experience of parenthood, and institutional structures play a crucial role in either reinforcing paternal marginalization or supporting fathers in establishing a meaningful and confident parental role.

From a clinical perspective, several implications emerge. First, fathers should be actively recognized as co-parents from the very beginning of hospitalization. Equitable access policies are essential to ensure that both mothers and fathers can be present and engaged, minimizing the risk of paternal marginalization. Second, staff training should prioritize empathic and inclusive communication, acknowledging fathers' emotional as well as informational needs. Third, structured opportunities for paternal caregiving—such as kangaroo care, feeding, or participation in daily routines—should be normalized as standard practice, not left to chance. These practices not only strengthen paternal identity but also reduce helplessness and promote family resilience. Finally, formal peer-support programs could build on the spontaneous solidarity described by fathers, offering a sustainable source of mutual understanding and companionship.

Importantly, the persistence of uncertainty and hypervigilance beyond discharge points to the need for post-hospitalization support that explicitly includes fathers. Targeted follow-up programs can help address emotional distress, reinforce caregiving competence, and promote long-term family adjustment.

In addition to clinical and psychological benefits, these measures may have significant economic implications. Evidence indicates that family-centered models of neonatal care, especially those involving fathers, are associated with shorter hospital stays, improved infant outcomes, and lower rates of rehospitalization (O'Brien et al., 2018; Chen et al., 2025). These findings suggest the need for ensuring that fathers' involvement is not left to chance or to the goodwill of individual staff members but becomes a structural priority of neonatal care throughout the country.

4.5. Conclusion

This study contributes to making fathers' experiences in neonatal intensive care visible, highlighting how their sense of identity and involvement is shaped not only by personal and

relational factors but also by institutional structures. A key contribution lies in showing how these experiences vary across levels of neonatal care: organizational resources, access policies, and relational cultures profoundly influence whether fathers feel included or marginalized, underscoring the systemic nature of paternal adjustment.

Future comparative studies across healthcare systems could further clarify how policy, organizational models, and cultural norms shape paternal experiences and opportunities for inclusion. Recognizing and supporting fathers in the NICU is not an optional enhancement but a structural requirement for more humanized, equitable, and effective neonatal care.

5. General Discussion

The perinatal period represents a profound developmental, psychological, and relational turning point—a window in which biological, emotional, and cultural processes converge to shape trajectories of parental adjustment and child development (Howard & Khalifeh, 2020; Dossett et al., 2024). Far from being a merely biological event, becoming a parent is a complex, ongoing transition involving identity negotiations, embodied transformations, shifting relational dynamics, and encounters with institutional structures (Hajure et al., 2024). This transition unfolds within cultural narratives that continue to idealize early parenthood, often framing it as instinctive, harmonious, and naturally fulfilling. Yet, the lived experiences of mothers and fathers frequently reveal a more intricate landscape, one characterized by the coexistence of vulnerability and resilience, of emotional intensity and relational complexity (Howard & Khalifeh, 2020; Hajure et al., 2024).

Within this evolving landscape, medicalization has assumed an increasingly central role. Assisted reproductive technologies (ART), delayed parenthood, and neonatal intensive care units (NICUs) are emblematic contexts of contemporary perinatality: they expand the possibilities of parenthood and may shape the symbolic, emotional, and relational construction of parenthood. While these advances offer important opportunities, they may also introduce new layers of complexity that require sensitive, family-centered approaches to perinatal care (Tambelli, Trentini, & Cerniglia, 2025).

Against this backdrop, this thesis examined perinatal mental health through two complementary lines of research: a longitudinal investigation of maternal well-being during pregnancy and postpartum, and a qualitative exploration of paternal experiences in NICUs. Taken together, these studies offer a multidimensional view of the psychological processes shaping early parenthood.

The longitudinal findings provide new insights into maternal emotional adjustment across the perinatal transition. Across both time points, the majority of participants presented subthreshold

levels of psychological symptoms, yet a clinically meaningful proportion of women experienced significant emotional distress during pregnancy and postpartum. This finding underscores a crucial aspect often neglected in both clinical practice and research: psychological suffering in the perinatal period is not limited to severe, diagnosable disorders, but frequently manifests in forms of subclinical distress that may still exert substantial effects on maternal functioning, bonding, and family dynamics (Lederman & Weis, 2020). These "silent" forms of suffering, while less visible, are clinically relevant and deserve systematic attention and early intervention.

No significant differences emerged between women who conceived through ART and those who conceived spontaneously with respect to overall psychological outcomes at baseline. However, conception through ART remained a significant predictor of higher postpartum anxiety, suggesting that ART may act less as a risk factor per se than as a contextual variable shaping specific emotional trajectories. Rather than being pathologized, these experiences should be approached as clinical signals warranting early monitoring and preventive support, particularly during the late pregnancy and early postpartum phases (Pellerone et al., 2023; Galbally et al., 2024; Grønlund et al., 2025).

The longitudinal approach further clarified maternal trajectories of emotional adjustment from pregnancy to postpartum, confirming that pregnancy and postpartum are not two separate psychological conditions but a single, continuous developmental process, in which early emotional vulnerabilities often persist or evolve over time, supporting the relevance of early identification and intervention during the prenatal phase (Petri et al., 2018; Henrichs et al., 2023).

Another element that emerged with particular relevance is maternal loneliness, a dimension often overlooked in perinatal care despite its high prevalence. Feelings of isolation, especially when coupled with subthreshold distress, may undermine maternal well-being, reduce help-seeking behaviors, and exacerbate emotional suffering (Kent-Marvick et al., 2022; Adlington,

2023). Addressing loneliness requires moving beyond individual-focused models to strengthen relational and contextual support systems, including partner involvement, family support, and community networks (Antoniou et al., 2021; Adlington, 2023).

Within this framework, it becomes evident that a nuanced understanding of specific and transversal risk and protective factors is essential to identify women at greater risk of developing psychological distress and to implement timely and effective preventive interventions (Alipour et al., 2018; Míguez & Vázquez, 2021). Perinatal mental health cannot be fully understood through the lens of diagnostic categories alone; it requires attention to the underlying processes that shape emotional adaptation across the transition to parenthood (Lederman & Weis, 2020; Tambelli, Trentini, & Cerniglia, 2025). In this sense, exploring psychological dimensions such as defense mechanisms and the quality of prenatal and postnatal attachment may provide valuable insights into individual trajectories of vulnerability and resilience (Carone et al., 2025). At the same time, the central role of partner support emerges as a key protective factor, with implications for designing family-centered interventions that systematically involve both parents in screening, psychoeducation, and support throughout the perinatal period (Antoniou et al., 2021; McCann et al., 2024).

In parallel, the qualitative study explored paternal experiences in neonatal intensive care units (NICUs), focusing on how the early construction of paternal identity unfolds in medicalized and uncertain contexts. The findings point to the central role of cultural and institutional dynamics in shaping how fathers position themselves—and are positioned—within the perinatal landscape. While paternal involvement is increasingly recognized as beneficial for infant development and family functioning, fathers continue to encounter environments structured primarily around the maternal–infant dyad, which can generate feelings of marginalization and limit their active participation (Stefana et al., 2022; Stern-Delfils et al., 2023; Webber et al., 2025).

What emerges clearly is that paternal presence in NICUs is not solely determined by individual motivation or psychological disposition, but is deeply conditioned by contextual factors such as access policies, organizational routines, and professional communication styles (Schmid et al., 2024; Stefana et al., 2024). When these structures are restrictive or implicitly gendered, they risk reinforcing the cultural script of fathers as "secondary caregivers" (Provenzi & Santoro, 2015; Webber et al., 2025). Conversely, inclusive practices—such as shared caregiving, direct and empathetic communication, and the normalization of kangaroo care—can foster a sense of belonging, agency, and early bonding, offering fathers the opportunity to experience themselves as active and legitimate caregivers (Aljawad et al., 2025; Webber et al., 2025). This line of research also invites a broader reflection on cultural narratives of parenthood. In many contexts, fathers continue not only to be perceived, but also to perceive themselves, as supportive figures rather than as central agents of care (Watkins et al., 2024). This internalized positioning often reflects and reinforces broader cultural scripts, contributing to their partial withdrawal from early caregiving spaces and limiting their sense of legitimacy and agency as parents (Hrdy, 2023). This dynamic is mirrored in the limited access to paternal leave, in rigid organizational models that privilege maternal caregiving, and in persistent symbolic representations of parenting roles (Hrdy, 2023). Challenging these cultural assumptions is not simply a matter of equity, but a matter of public health: supporting paternal engagement has measurable implications for maternal well-being, infant development, and family adjustment (Petts & Knoester, 2018).

Across these two lines of research, a set of interconnected themes emerges, each carrying specific clinical and public health implications.

Vulnerability stands out as a defining feature of the perinatal period. Rather than signaling pathology, vulnerability can be understood as an opening—a critical space for early, sensitive intervention. Experiences such as anxiety, loneliness, or marginalization, though often subclinical and less visible, can nonetheless have substantial effects on parental functioning,

bonding, and family dynamics (Howard & Khalifeh, 2020). Recognizing these early signals through systematic, relationally attuned screening during pregnancy and postpartum may allow timely support, preventing escalation and promoting adaptive adjustment (Lederman & Weis, 2020).

Equally important is the relational dimension of perinatal well-being. Partner support, the quality of healthcare communication, and institutional practices that include both parents shape how individuals navigate this transition (Antoniou et al., 2021). Strengthening these dimensions through couple-based interventions, psychoeducational programs, and inclusive healthcare practices can enhance parental self-efficacy, foster bonding, and build family resilience. This perspective underscores the need to move from individual-centered models toward family-centered approaches in perinatal care (Chalmers, 2021).

Perinatal experiences are also embedded within cultural narratives that continue to position mothers as primary caregivers and fathers as secondary figures. These narratives, often internalized, influence identity construction, help-seeking, and caregiving engagement (Hrdy, 2023; Tambelli, Trentini, & Cerniglia, 2025). Addressing these cultural scripts in clinical settings—through inclusive communication, parent preparation courses, and policy measures such as extended paternal leave—can support both parents' active participation and sense of legitimacy in early caregiving (Chalmers, 2021).

Finally, medicalization represents a context that, while expanding possibilities for parenthood, may heighten emotional and relational vulnerability. Sensitive clinical attention in medicalized settings—such as ART pathways or NICUs—can transform these fragile contexts into opportunities for preventive intervention. This includes early psychological support, flexible organizational policies (e.g., NICU visiting), and integrative care pathways that recognize the emotional dimensions of medicalized parenthood (Dossett et al., 2024).

5.1. Limitations and strengths

While the findings cannot be generalized in a statistical sense, they offer clinically and theoretically meaningful insights into psychological and relational processes unfolding during the perinatal period. Rather than aiming for representativeness, this present thesis adopts a process-oriented perspective, allowing the identification of patterns of vulnerability, adaptation, and meaning-making that may be relevant to similar perinatal and medicalized care contexts. These findings should be interpreted in light of several methodological limitations. The quantitative studies relied on self-report measures, which may introduce bias and limit causal inferences. Moreover, the relatively homogeneous sample—composed largely of women participating in a structured antenatal course—may restrict the generalizability of results and may have influenced the observed symptom levels. The absence of paternal data limited the possibility of conducting dyadic or family-level analyses, while the relatively small sample size at T1 constrained the exploration of group differences and longitudinal trajectories.

The qualitative study also presents specific limitations. The use of a self-selected sample and retrospective accounts may have introduced selection and recall biases, and the lack of direct institutional data prevented triangulation between fathers' narratives and objective organizational indicators. In addition, the study included only fathers of surviving infants, thus providing a partial view of paternal experiences in NICUs.

Despite these limitations, several aspects strengthen the overall contribution of this thesis. The integration of quantitative and qualitative methodologies allowed for a multidimensional understanding of perinatal adaptation, combining the statistical exploration of maternal trajectories with the in-depth examination of paternal experiences. The longitudinal design of the maternal studies provided valuable insight into the continuities and transformations of psychological well-being across pregnancy and the postpartum period, while the qualitative

analysis offered a situated perspective on the relational and institutional processes shaping early parenthood.

The inclusion of diverse care contexts enhanced the ecological validity of the findings and underscored the importance of contextual and systemic factors in shaping perinatal experiences, By combining quantitative and qualitative perspectives, this thesis highlights the value of an integrative and relational approach to perinatal mental health, aimed at bridging clinical, psychological, and sociocultural dimensions.

Future research could integrate maternal and paternal trajectories within the same analytic frameworks, using longitudinal and mixed-method designs to better capture how experiences interact and evolve over time. Larger and more diverse samples may also allow for a more nuanced exploration of subgroup differences and contextual factors.

5.2. Conclusion

The perinatal period is both a time of heightened vulnerability and a strategic window of opportunity. It is a phase in which identities are constructed, bonds are forged, and institutional contexts can either support or hinder psychological adaptation. Recognizing vulnerability not as a deficit but as a space for meaningful intervention opens new possibilities for early, sensitive, and preventive care (Guarnieri et al., 2025). Taken together, the findings of this thesis highlight the importance of adopting a multidimensional, family-centered, and preventive approach to perinatal mental health—one that is relationally attuned and capable of addressing subtle forms of distress before they escalate (Guarnieri et al., 2025.

By integrating early detection of maternal distress, the structural inclusion of fathers, and systemic, relationship-based interventions, perinatal care can move toward more equitable and supportive models (Chalmers, 2021). Such a shift is not only clinically relevant but also

culturally transformative: it redefines parenthood as a shared, legitimate, and supported experience for both mothers and fathers (Hrdy, 2023).

In this sense, promoting perinatal mental health is not simply about preventing disorder. It is about fostering well-being, resilience, and connectedness at the very beginning of life, laying the groundwork for healthier developmental trajectories for children and more balanced, supported experiences for parents.

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Appendix A – Supplementary table Maternal Well-being T0

Table S1. Descriptive analysis of Sociodemographic and clinical characteristics

	N = 297
Age >35 years, n (%)	
No	139 / 297 (47%)
Yes	158 / 297 (53%)
Marital status, n (%)	
Cohabiting	142 / 297 (48%)
Married	153 / 297 (52%)
Single	2 / 297 (0.7%)
Education level, n (%)	
Less than university degree	84 / 297 (28%)
At least university degree	213 / 297 (72%)
Occupation, n (%)	
Employee	240 / 274 (88%)
Self-employed	27 / 274 (9.9%)
Unemployed	7 / 274 (2.6%)
Missing	23
Gestational week	
Mean (SD)	31.26 (2.13)
Median (Q1, Q3)	31.00 (30.00, 32.00)
Working after the 20th week of pregnancy, n (%)	
No	66 / 297 (22%)
Yes	231 / 297 (78%)
Months spent trying to conceive	
Mean (SD)	13.83 (18.55)
Median (Q1, Q3)	6.00 (1.00, 24.00)
Medically assisted reproduction (PMA), n (%)	
No	220 / 297 (74%)
Yes	77 / 297 (26%)
Unintentional pregnancy interruption, n (%)	
No	231 / 297 (78%)
Yes	66 / 297 (22%)
Pregnancy complications, n (%)	
Not at all / A little	255 / 297 (86%)
Fairly / Very much / Extremely	42 / 297 (14%)
Psychopathological symptoms, n (%)	
No	164 / 297 (55%)
Yes	133 / 297 (45%)
Currently consulting a professional, n (%)	
No	238 / 297 (80%)
Yes	59 / 297 (20%)
Partner support, n (%)	
Not at all / A little / Fairly	48 / 297 (16%)
Very much / Extremely	249 / 297 (84%)
Family support, n (%)	
Not at all / A little / Fairly	80 / 297 (27%)
Very much / Extremely	217 / 297 (73%)

Table S2. Descriptive statistics for sociodemographic and clinical characteristics stratified by conception mode

Characteristic	Spontaneous conception n = 220	Medically assisted reproduction (ART) n = 77	p-value*
Age >35 years, n (%)			<0.0001
No	126 / 220 (57%)	13 / 77 (17%)	
Yes	94 / 220 (43%)	64 / 77 (83%)	
Marital status, n (%)			0.0061
Cohabiting	116 / 220 (53%)	26 / 77 (34%)	
Married	102 / 220 (46%)	51 / 77 (66%)	
Single	2 / 220 (0.9%)	0 / 77 (0%)	
Education level, n (%)			0.1061
Less than university degree	68 / 220 (31%)	16 / 77 (21%)	
At least university degree	152 / 220 (69%)	61 / 77 (79%)	
Occupation, n (%)			0.0228
Employee	169 / 200 (85%)	71 / 74 (96%)	
Self-employed	25 / 200 (13%)	2 / 74 (2.7%)	
Unemployed	6 / 200 (3.0%)	1 / 74 (1.4%)	
Missing	20	3	
Gestational week			0.7853
Mean (SD)	31.22 (2.10)	31.38 (2.20)	
Median (Q1, Q3)	31.00 (30.00, 32.00)	31.00 (30.00, 33.00)	
Working after the 20th week of pregnancy, n (%)			0.8735
No	50 / 220 (23%)	16 / 77 (21%)	
Yes	170 / 220 (77%)	61 / 77 (79%)	
Months spent trying to conceive			<0.0001
Mean (SD)	6.61 (10.58)	34.44 (20.89)	
Median (Q1, Q3)	3.00 (1.00, 6.50)	30.00 (24.00, 48.00)	
Unintentional pregnancy interruption, n (%)			0.0790
No	177 / 220 (80%)	54 / 77 (70%)	
Yes	43 / 220 (20%)	23 / 77 (30%)	
Pregnancy complications, n (%)			0.2561
Not at all / A little	192 / 220 (87%)	63 / 77 (82%)	
Fairly / Very much / Extremely	28 / 220 (13%)	14 / 77 (18%)	
Psychopathological symptoms, n (%)			0.2343
No	126 / 220 (57%)	38 / 77 (49%)	
Yes	94 / 220 (43%)	39 / 77 (51%)	
Currently consulting a professional, n (%)			0.0683
No	182 / 220 (83%)	56 / 77 (73%)	
Yes	38 / 220 (17%)	21 / 77 (27%)	
Partner support, n (%)			0.7199
Not at all / A little / Fairly	37 / 220 (17%)	11 / 77 (14%)	
Very much / Extremely	183 / 220 (83%)	66 / 77 (86%)	
Family support, n (%)			0.4580
Not at all / A little / Fairly	62 / 220 (28%)	18 / 77 (23%)	
Very much / Extremely	158 / 220 (72%)	59 / 77 (77%)	

*Fisher's exact test for categorical variables; Mann–Whitney test for numerical variables.

Table S3. Descriptive Analyses of Psychological outcomes stratified by conception mode

Variable	Spontaneous conception n = 220	Medically assisted reproduction (PMA) n = 77	p-value
STAI-Y – State anxiety			0.12
Mean (SD)	38.29 (8.65)	39.78 (8.31)	
Median (Q1, Q3)	37.00 (32.00, 42.00)	38.00 (34.00, 46.00)	
STAI-Y – Trait anxiety			0.1992
Mean (SD)	37.64 (8.59)	38.96 (8.40)	
Median (Q1, Q3)	37.00 (32.00, 43.00)	38.00 (33.00, 45.00)	
PRAQ_FearGivingBirth			0.9305
Mean (SD)	8.88 (2.83)	9.08 (3.30)	
Median (Q1, Q3)	9.00 (7.00, 11.00)	9.00 (6.00, 12.00)	
(Missing)	4	2	
PRAQ_WorriesDisabledChild			0.5257
Mean (SD)	9.62 (3.91)	9.87 (3.73)	
Median (Q1, Q3)	9.00 (7.00, 12.00)	9.00 (7.00, 12.00)	
(Missing)	4	2	
PRAQ_ConcernAppearance			0.7433
Mean (SD)	7.28 (3.20)	7.35 (2.86)	
Median (Q1, Q3)	7.00 (5.00, 10.00)	7.00 (5.00, 9.00)	
(Missing)	4	2	
PRAQ_Total			0.6996
Mean (SD)	25.78 (7.15)	26.29 (6.91)	
Median (Q1, Q3)	25.00 (19.50, 30.00)	25.00 (21.00, 32.00)	
(Missing)	4	2	
UCLA			0.8819
Mean (SD)	40.10 (9.33)	40.44 (9.60)	
Median (Q1, Q3)	39.00 (34.00, 47.00)	40.00 (34.00, 46.00)	
(Missing)	6	2	
Epds			0.0871
Mean (SD)	7.75 (4.56)	8.91 (5.10)	
Median (Q1, Q3)	7.00 (4.00, 11.00)	9.00 (5.00, 12.00)	
MAAS_Quality			0.3663
Mean (SD)	26.30 (2.31)	25.98 (2.20)	
Median (Q1, Q3)	26.00 (25.00, 28.00)	26.00 (25.00, 27.00)	
(Missing)	24	13	
MAAS_Intensity			0.8849
Mean (SD)	24.33 (2.56)	24.33 (2.51)	
Median (Q1, Q3)	24.00 (23.00, 26.00)	24.00 (23.00, 26.00)	
(Missing)	24	13	
MAAS_Total			0.5572
Mean (SD)	50.63 (2.98)	50.31 (3.24)	
Median (Q1, Q3)	50.50 (49.00, 53.00)	50.00 (48.00, 52.00)	
(Missing)	24	12	
REM-71 Factor 1 – Immature defenses			0.7691
Mean (SD)	3.65 (0.89)	3.70 (0.89)	
Median (Q1, Q3)	3.61 (3.10, 4.25)	3.62 (3.01, 4.38)	
(Missing)	23	12	
REM-71 Factor 2 – Mature defenses			0.5333
Mean (SD)	5.45 (0.84)	5.56 (0.86)	
Median (Q1, Q3)	5.43 (4.88, 6.15)	5.36 (4.95, 6.19)	
(Missing)	23	12	

Table S4. Spearman correlations for spontaneous conception group

Variable	STAI-Y Trait anxiety	REM-71 Factor 1 Immature defenses	REM-71 Factor 2 Mature defenses	Months spent trying to conceive
STAI-Y - State anxiety	0.736 (<0.0001)	0.2975 (<0.0001)	-0.175 (0.0139)	-0.0962 (0.1552)
PRAQ_FearGivingBirth	0.2103 (0.0019)	0.2626 (0.0002)	-0.104 (0.1457)	-0.0035 (0.9593)
PRAQ_WorriesDisabledChild	0.3582 (<0.0001)	0.3036 (<0.0001)	-0.0315 (0.6604)	0.0679 (0.3208)
PRAQ_ConcernAppearance	0.2592 (0.0001)	0.2296 (0.0012)	-0.1462 (0.0404)	0.0378 (0.5803)
PRAQ_Total	0.3877 (<0.0001)	0.3838 (<0.0001)	-0.1258 (0.0782)	0.0442 (0.5181)
UCLA	0.442 (<0.0001)	0.4785 (<0.0001)	-0.0355 (0.6201)	-0.0592 (0.3891)
epds	0.6175 (<0.0001)	0.3802 (<0.0001)	-0.0415 (0.5622)	-0.0148 (0.8275)
MAAS_Quality	0.0516 (0.4724)	-0.0094 (0.8958)	-0.1684 (0.0183)	-0.0185 (0.7964)
MAAS_Intensity	-0.2246 (0.0016)	-0.139 (0.0521)	0.1061 (0.1387)	0.1102 (0.1241)
MAAS_Total	-0.1214 (0.0901)	-0.1355 (0.0583)	-0.0044 (0.9510)	0.0688 (0.3381)

Table S4. Spearman correlations for spontaneous conception group

Variable	MAAS_Quality	MAAS_Intensity	MAAS_Total
STAI-Y - State anxiety	0.1007 (0.1601)	-0.3473 (<0.0001)	-0.174 (0.0147)
PRAQ_FearGivingBirth	-0.0247 (0.7312)	-0.0422 (0.5572)	-0.0251 (0.7272)
PRAQ_WorriesDisabledChild	0.0325 (0.6510)	-0.3217 (<0.0001)	-0.2711 (0.0001)
PRAQ_ConcernAppearance	0.172 (0.0159)	-0.2032 (0.0043)	-0.0273 (0.7045)
PRAQ_Total	0.0893 (0.2133)	-0.2998 (<0.0001)	-0.1861 (0.0090)
UCLA	0.0011 (0.9875)	-0.1754 (0.0139)	-0.1158 (0.1060)
epds	0.0395 (0.5825)	-0.2468 (0.0005)	-0.1646 (0.0211)

Table S5. Spearman correlations for ART group

Variable	STAI-Y Trait anxiety	REM-71 Factor 1 Immature defenses	REM-71 Factor 2 Mature defenses	Months spent trying to conceive
STAI-Y - State anxiety	0.72 (<0.0001)	0.451 (0.0002)	-0.2969 (0.0163)	-0.0962 (0.4053)
PRAQ_FearGivingBirth	0.2702 (0.0191)	0.2055 (0.1005)	-0.2828 (0.0225)	-0.0369 (0.7532)
PRAQ_WorriesDisabledChild	0.3747 (0.0009)	0.3494 (0.0043)	-0.1983 (0.1133)	-0.0928 (0.4282)
PRAQ_ConcernAppearance	0.0993 (0.3966)	0.1546 (0.2189)	-0.1282 (0.3087)	-0.0845 (0.4712)
PRAQ_Total	0.367 (0.0012)	0.3339 (0.0066)	-0.3449 (0.0049)	-0.1392 (0.2337)
UCLA	0.5361 (<0.0001)	0.4158 (0.0006)	-0.3587 (0.0033)	0.0801 (0.4944)
epds	0.549 (<0.0001)	0.469 (<0.0001)	-0.02 (0.8741)	-0.0058 (0.9603)
MAAS_Quality	0.1199 (0.3455)	0.1595 (0.2080)	-0.0637 (0.6169)	0.1718 (0.1746)
MAAS_Intensity	-0.3883 (0.0015)	-0.0616 (0.6285)	0.2098 (0.0961)	0.1231 (0.3326)
MAAS_Total	-0.2342 (0.0625)	0.0568 (0.6555)	0.1072 (0.3993)	0.2374 (0.0589)

Table S5. Spearman correlations for ART group

Variable	MAAS_Quality	MAAS_Intensity	MAAS_Total
STAI-Y - State anxiety	0.1995 (0.1140)	-0.3814 (0.0019)	-0.1563 (0.2174)
PRAQ_FearGivingBirth	0.0043 (0.9733)	-0.2038 (0.1063)	-0.1919 (0.1287)
PRAQ_WorriesDisabledChild	0.2685 (0.0320)	-0.2461 (0.0500)	-0.0142 (0.9112)
PRAQ_ConcernAppearance	0.0285 (0.8229)	0.0821 (0.5190)	0.1205 (0.3429)
PRAQ_Total	0.1755 (0.1655)	-0.1674 (0.1860)	-0.0267 (0.8339)
UCLA	0.3624 (0.0032)	-0.222 (0.0779)	0.0672 (0.5979)
epds	0.2683 (0.0321)	-0.2306 (0.0668)	-0.0181 (0.8870)

Appendix B - Supplementary table Maternal Well-being T1

Table S1. Descriptive statistics at T1 stratified by conception mode

Characteristic	**Spontaneous conception n = 53**	**Medically assisted reproduction (PMA) n = 23**	**p-value**
Age (T0) >35 years, n (%)			0.0047
No	25 / 53 (47%)	3 / 23 (13%)	
Yes	28 / 53 (53%)	20 / 23 (87%)	
Birth type			0.4084
Natural	40 / 53 (75%)	15 / 23 (65%)	
Cesarean	13 / 53 (25%)	8 / 23 (35%)	
Maternal complications			0.5450
No	43 / 53 (81%)	17 / 23 (74%)	
Yes	10 / 53 (19%)	6 / 23 (26%)	
Neonatal complications			0.0533
No	47 / 53 (89%)	16 / 23 (70%)	
Yes	6 / 53 (11%)	7 / 23 (30%)	
Support healthcare staff			0.2072
not at all/a little/somewhat	22 / 53 (42%)	13 / 22 (59%)	
much/very much	31 / 53 (58%)	9 / 22 (41%)	
(Missing)	0	1	
Breastfeeding			0.6857
No	5 / 53 (9.4%)	3 / 22 (14%)	
Yes	48 / 53 (91%)	19 / 22 (86%)	
(Missing)	0	1	
Breastfeeding experience_emotional			0.3894
negative/neutral	14 / 48 (29%)	8 / 19 (42%)	
Positive	34 / 48 (71%)	11 / 19 (58%)	
(Missing)	5	4	
Psychological support postpartum			0.4666
No	47 / 53 (89%)	18 / 22 (82%)	
Yes	6 / 53 (11%)	4 / 22 (18%)	
(Missing)	0	1	
Partner Support T1			0.2063
not at all/a little/somewhat	18 / 53 (34%)	11 / 22 (50%)	
much/very much	35 / 53 (66%)	11 / 22 (50%)	
(Missing)	0	1	

Table S2. Spearman correlations between psychological variables (at T0 and T1) and psychological outcomes at T1.

Variable	STAI-Y State anxiety T1	epds T1	UCLA T1	PBQ T1
REM-71 Factor 1 – Immature defenses T0	0.4541 (<0.0001)	0.2692 (0.0204)	0.2931 (0.0125)	0.1465 (0.2228)
REM-71 Factor 2 – Mature defenses T0	-0.1883 (0.1082)	-0.207 (0.0768)	-0.2138 (0.0714)	-0.1331 (0.2686)
STAI-Y - Trait anxiety T0	0.5424 (<0.0001)	0.4318 (0.0001)	0.3573 (0.0021)	0.4106 (0.0004)
STAI-Y - State anxiety T0	0.6181 (<0.0001)	0.3862 (0.0007)	0.4138 (0.0003)	0.3235 (0.0059)
PRAQ_FearGivingBirth T0	0.2586 (0.0261)	0.3039 (0.0085)	0.3311 (0.0045)	-0.0402 (0.7392)
PRAQ_WorriesDisabledChild T0	0.3981 (0.0004)	0.173 (0.1404)	0.375 (0.0012)	0.3148 (0.0075)
PRAQ_ConcernAppearance T0	0.4093 (0.0003)	0.2248 (0.0542)	0.3707 (0.0013)	0.1221 (0.3104)
PRAQ_Total T0	0.4687 (<0.0001)	0.2904 (0.0121)	0.4796 (<0.0001)	0.1832 (0.1261)
UCLA T0	0.4846 (<0.0001)	0.3243 (0.0048)	0.757 (<0.0001)	0.2877 (0.0150)
Epds T0	0.4392 (<0.0001)	0.5604 (<0.0001)	0.3272 (0.0050)	0.144 (0.2309)
MAAS_Quality T0	-0.0152 (0.8978)	-0.1375 (0.2426)	-0.0338 (0.7780)	0.4274 (0.0002)
MAAS_Intensity T0	-0.3551 (0.0019)	-0.0746 (0.5278)	-0.3148 (0.0071)	-0.243 (0.0411)
MAAS_Total T0	-0.269 (0.0205)	-0.1844 (0.1158)	-0.276 (0.0189)	0.0987 (0.4128)

Appendix C – Supplementary materials NICU

Table S1. Socio-demographic characteristics of the fathers

Partecipant	Age	Education	Occupation	Number of children
N1	38	High school diploma	Business owner	1st child
N2	34	Middle school	Car repairer	2nd child (twins)
N3	35	University degree	Technical employee	1st child
N4	43	High school diploma	Factory worker	2nd child
N5	38	High school diploma	Clerk	1st child
N6	41	University degree	Manager	1st child
N7	45	High school diploma	Bartender	1st child
N8	34	University degree	Police officer	1st child
N9	34	University degree	Doctor	1st child
N10	40	High school diploma	Clerk	1st child
N11	42	University degree	Doctor	1st child
N12	49	Middle school	Artisan	1st child (triplets)
N13	40	University degree	Salesperson	2nd child
N14	38	University degree	Clerk	2nd child
N15	29	Middle school	Factory worker	1st child (twins)
N16	30	High school diploma	Salesperson	1st child
N17	39	University degree	CEO	2nd child
N18	39	High school diploma	Clerk	1st child
N19	32	PhD	Researcher	1st child
N20	45	High school diploma	Actor	1st child
N21	43	University degree	Clerk	1st child
N22	31	Middle school	Factory worker	1st child
N23	38	PhD	Researcher	2nd child
N24	42	University degree	Clerk	1st child
N25	35	University degree	Architect	1st child
N26	44	University degree	Doctor	1st child
N27	33	University degree	Teacher	1st child
N28	37	University degree	Clerk	1st child (twins)
N29	36	High school diploma	Warehouse worker	1st child
N30	39	High school diploma	Technical assistant	2nd child
N31	32	High school diploma	Factory worker	1st child (twins)

N32	46	High school diploma	Clerk	1st child
N33	38	High school diploma	Factory worker	1st child (twins)
N34	35	Middle school	Factory worker	1st child
N35	40	High school diploma	Self-employed	1st child
N36	35	University degree	Foreign trade worker	1st child
N37	41	University degree	Freelancer	2nd child (twins)
N38	40	High school diploma	Maintenance technician	2nd child
N39	43	Middle school	Factory worker	1st child
N40	39	High school diploma	Factory worker	1st child
N41	45	PhD	Teacher	1st child
N42	40	University degree	Psychologist	2nd child
N43	53	High school diploma	Entrepreneur	2nd child
N 44	31	University degree	Teacher	2nd child
N45	34	University degree	Lawyer	1st child
N46	43	University degree	Engineer	1st child
N47	30	University degree	Police officer	1st child (twins)

Table S2. Sociodemographic infant characteristics

Partecipants	Gender	Gestational age at birth	Birth weight (g)	Days of hospitalization
N1	Male	35 weeks	2340	7
N2	Male, Female	35 weeks	2100 - 2375	7
N3	Male	25 weeks + 3 days	690	122
N4	Female	27 weeks	980	65
N5	Female	28 weeks	900	84
N6	Female	30 weeks + 3 days	1439	40
N7	Female	27 weeks + 5 days	1150	80
N8	Female	31 weeks	1650	36
N9	Male	34 weeks	3505	7
N10	Female, Female	32 weeks + 6 days	1960 - 2155	21
N11	Male	29 weeks + 4 days	730	Ongoing
N12	Male, Female, Female	24 weeks	860 – 1100 - 1054	60
N13	Female	33 weeks + 4 days	1600	29
N14	Male	33 weeks + 4 days	2355	41

N15	Female	32 weeks + 2 days	1690	38
N16	Male	36 weeks + 2 days	2280	72
N17	Female	25 weeks + 4 days	740	100
N18	Male	23 weeks + 3 days	750	119
N19	Female	30 weeks	1100	59
N20	Male	28 weeks	980	75
N21	Male	23 weeks + 3 days	650	120
N22	Male	27 weeks + 1 days	406	127
N23	Female	28 weeks + 1 day	1180	56
N24	Male	30 weeks + 6 days	1490	44
N25	Female	30 weeks + 4 days	1115	45
N26	Female	34 weeks + 5 days	2055	160
N27	Male	32 weeks + 2 days	1916	14
N28	Male, Male	34 weeks	2340 - 1820	18
N29	Female	27 weeks + 1 day	900	95
N30	Female	28 weeks + 5 days	814	61
N31	Male, Male	25 weeks + 6 days	850 - 945	70, 87
N32	Female	36 weeks	2180	7
N33	Female, Male	34 weeks + 3 days	1990 - 2310	14 – 7
N34	Male	32 weeks + 6 days	1650	20
N35	Female	24 weeks	670	229
N36	Male	27 weeks	1100	108
N37	Male	32 weeks + 1 day	680	150
N38	Male	27 weeks	1100	Ongoing
N39	Male	28 weeks	1000	98
N40	Female	24 weeks + 5 days	600	100
N41	Male	25 weeks + 2 days	876	145
N42	Female	25 weeks + 5 days	714	Ongoing
N43	Male	26 weeks	890	83
N 44	Female	25 weeks + 5 days	760	100
N45	Male	34 weeks + 5 days	1680	28
N46	Male	28 weeks	1080	80
N47	Male, Male	32 weeks + 5 days	2145	30

Table S3: Hospitals with COVID-19–related restrictions

Participants	Region	Levels of care	COVID-19 related restrictions
N1	Piemonte	High	Sì
N2	Marche	Low	Sì
N3	Veneto	Medium	Sì
N4	Campania	Medium	Sì
N5	Piemonte	High	Sì
N6	Lombardia	High	No
N7	Umbria	Low	No
N8	Lazio	Medium	Sì
N9	Marche	Medium	Sì
N10	Lombardia	High	No
N11	Marche	Medium	Sì
N12	Veneto	Medium	No
N13	Lombardia	High	Sì
N14	Lombardia	High	No
N15	Emilia-Romagna	Low	Sì
N16	Campania	Low	Sì
N17	Lazio	Low	Sì
N18	Campania	Medium	Sì
N19	Lombardia	High	Sì
N20	Veneto	Medium	Sì
N21	Veneto	Medium	No
N22	Veneto	High	Sì
N23	Liguria	High	Sì
N24	Lombardia	Medium	Sì
N25	Veneto	Medium	Sì
N26	Lombardia	High	No
N27	Lombardia	High	Sì
N28	Emilia-Romagna	Low	Sì
N29	Trentino-Alto Adige	Medium	Sì
N30	Lombardia	High	Sì
N31	Emilia-Romagna	High	No
N32	Sicilia	Low	Sì
N33	Puglia	Low	Sì

N34	Puglia	Low	Sì
N35	Puglia	Medium	No
N36	Sardegna	Medium	No
N37	Lazio	High	No
N38	Lombardia	Medium	No
N39	Lombardia	High	No
N40	Liguria	High	No
N41	Sardegna	Medium	No
N42	Puglia	Medium	No
N43	Lazio	Low	Sì
N 44	Puglia	Low	No
N45	Puglia	Low	No
N46	Lazio	Low	No
N47	Lombardia	High	No

Appendix D – Supplementary materials NICU

Interview guide

CONCEPIMENTO

La gravidanza del bambino è stata programmata? ( ) Sì ( ) No

Qual era la sua situazione coniugale nel periodo di gravidanza?

( ) celibe ( ) sposato ( ) convivenza con la madre del bambino

Questa è stata la prima gravidanza della madre del bambino?

( ) Sì ( ) No

Se no, quante gravidanze aveva già avuto? _____

Le precedenti gravidanze si sono tutte concluse con nascite a termine?

( ) Sì ( ) No

Aveva avuto qualche aborto prima della gravidanza di questo bambino?

( ) No ( ) Sì: motivo:_____

Figli nati morti? ( ) No ( ) Sì: motivo:_____

Figli deceduti? ( ) No ( ) Sì: motivo:_____

Altro/altri figlio/i prematuro/i? ( ) No ( ) Sì: motivo:_____

Aveva avuto una gravidanza multipla? ( ) No ( ) Sì

Ha ricevuto un'assistenza medica per la procreazione?

( ) No ( ) Sì di che tipo:_____

Gestazione

L'obiettivo è di ricostruire i passaggi salienti del percorso in termini di difficoltà, momenti di svolta, percezione di benessere/malessere/competenza/incompetenza

- Vorrei partire proprio dall'inizio, da quando cioè lei ha saputo che sarebbe diventato padre e vorrei chiederle di raccontare questo percorso fino al momento in cui poi è nato vostro figlio.

<u>Se non ne parla:</u>

- Ci sono state difficoltà che ha dovuto affrontare lungo questo percorso? Quali? Le vengono in mente episodi in particolare?
- Come si descriverebbe ripensando ai mesi in cui stava aspettando di diventare padre?

PARTO

L'obiettivo è di esplorare l'esperienza del ricovero in ospedale e del parto, identificando risorse positive e elementi di criticità e di approfondire l'attribuzione di causa del parto prematuro anche nel confronto con quella eventualmente offerta dai sanitari

La mamma del/della bambino/a stata ricoverata in ospedale per il rischio di parto prematuro?

( ) Sì ( ) No

Se sì, specificare per quanto tempo?_____

Tipo di parto:

( ) fisiologico ( ) forcipe ( ) cesareo ( ) indotto

Motivo:

Ha avuto complicazioni durante il parto?

( ) No ( ) Sì: quali:

- Vorrei ora che lei mi parlasse del parto e che mi raccontasse come è andata da quando siete arrivati in ospedale fino a quando poi è avvenuto il parto.
- Ripensando a quei momenti fino al parto, le viene in mente qualcosa o qualcuno che l'ha aiutata ad affrontare quella situazione?
- Quanto si è sentito di avere il controllo di quello che stava succedendo da quando siete entrati in ospedale e fino a quando il parto è avvenuto?
- Le vengono in mente elementi di soddisfazione rispetto al parto? Quali? E di insoddisfazione? Quali?
- Se lei potesse dare un suggerimento alla direzione dell'ospedale per aiutare altri padri che come lei hanno affrontato questa situazione, cosa suggerirebbe?
- Secondo lei quali sono state le cause del parto prematuro?
- Se le è stata fornita una spiegazione medica, secondo lei corrisponde alla sua personale interpretazione delle cause che hanno portato al parto prematuro?
- Chi le ha comunicato che ci sarebbero stati problemi che avrebbero reso necessario un passaggio in terapia intensiva neonatale? (La comunicazione è stata fatta a entrambi i genitori?) Per quanto lei si ricorda, che cosa le è stato detto? E lei personalmente cos'ha pensato in quel momento? Come valuta la comunicazione che ha ricevuto?

IL REPARTO DI TERAPIA INTENSIVA

L'obiettivo è di esplorare l'esperienza del reparto di terapia intensiva relativamente alle principali dimensioni di care identificate dalla letteratura: accesso, skin to skin, nutrizione, controllo del dolore, caratteristiche del reparto, supporto psicologico genitoriale.

- Ora vorrei parlare del periodo da quando/in cui suo figlio è/ è stato ricoverato in terapia intensiva dopo la nascita e quindi le chiederei di raccontarmi la sua esperienza nel modo più dettagliato che preferisce.

Se non ne parla, chiedere:

- Per quanto riguarda le visite a suo figlio, avete avuto la possibilità di accesso al reparto h24? Questa possibilità riguardava solo uno di voi alla volta oppure volendolo potevate accedere sempre in contemporanea? Se no, per quali ragioni? Lei personalmente cosa pensa di queste ragioni?
- In quel periodo avete avuto la possibilità di fare la cosiddetta kangaroo therapy? Le chiedo innanzitutto se la facevate tutti i giorni e per quanto tempo ogni volta. Come era organizzata tra lei e la sua compagna questa attività? (se non ne parla: chi la faceva, per quanto tempo e come hanno deciso questa alternanza?). Quali pensa sia l'utilità della kangaroo therapy per il bambino? E per il padre?
- Per quanto riguarda la nutrizione di suo figlio, cosa vi è stato detto in ospedale sull'allattamento al seno da parte della mamma? Ci sono state difficoltà da questo punto di vista? C'è qualcosa o qualcuno che ha aiutato a superare queste difficoltà? E per quanto riguarda più in generale le cure non sanitarie per il bambino, per esempio il cambio di pannolini e vestitini, come è stata la sua esperienza durante il ricovero in reparto?
- Vorrei approfondire la questione dei trattamenti sanitari per suo figlio. Ha avuto la sensazione che suo figlio provasse dolore? Se sì, quanto? Lei personalmente ritiene che nel reparto ci fossero delle procedure per controllare e ridurre il dolore di suo figlio? Se sì quali? In che misura le ha considerate efficaci?
- Quanto considera adeguato l'ambiente del reparto? Se non ne parla: per esempio in relazione al rumore? E all'illuminazione della stanza? E per quanto riguarda l'affollamento della stanza? E per quanto riguarda il numero di sanitari che vi operavano?
- Quale è stato secondo lei l'impatto del Covid sui servizi che vi sono stati garantiti durante la permanenza nel reparto? Cosa pensa delle soluzioni adottate per affrontare le limitazioni imposte dal Covid?
- Ripensando a quei momenti del ricovero, le viene in mente qualcosa o qualcuno che l'ha aiutata ad affrontare quella situazione?
- Quanto si è sentito di avere il controllo di quello che stava succedendo durante il ricovero? Quanto si è sentito adeguatamente informato dell'andamento della situazione durante il ricovero di suo figlio?
- Se lei potesse dare un suggerimento alla direzione dell'ospedale per aiutare altri padri che come lei hanno affrontato questa situazione, cosa suggerirebbe?
- Le vengono in mente altri elementi di soddisfazione rispetto alla sua esperienza di ricovero del bambino? E di insoddisfazione?
- Se non l'ha detto prima: Vorrei ora introdurre un nuovo argomento, cioè chiederle se le è stata offerta la possibilità di accedere a un servizio di consultazione psicologica prima della nascita di suo figlio o durante la permanenza di suo figlio in ospedale? Se le fosse stata offerta, personalmente sarebbe stato interessato? Perché?

ASPETTATIVE CIRCA IL FIGLIO E LA PATERNITA'

L'obiettivo è di esplorare le rappresentazioni del figlio, in particolare relativamente alla dimensione del rischio e della rappresentazione di sè come padre.

- Pensando alla futura crescita del bambino, come lo immagina?
- Esiste qualcosa che la preoccupa?
- Da quando è nato/a suo/a figlio/a, è cambiata la visione che lei ha di se stesso?
- Se dovesse descriversi come padre che aggettivi sceglierebbe?

Se nel corso dell'intervista emergono riferimenti a una causa che si intende avviare o a qualcuno che l'ha fatto, chiedere: Cosa ne pensa della causa intentata da queste persone? Per Lei, ci sono questioni legali aperte o in corso? Quali sono gli elementi che state valutando e che portereste in un'eventuale causa? Cosa vi aspettate da questa causa? Che previsione fate sull'andamento della causa?