

# PARENTS' POSTTRAUMATIC REACTIONS AND TRAUMA-RELATED COGNITIONS AFTER PREMATURE BIRTH

Marina Brice<sup>1</sup>, Anika Miltuze<sup>1</sup>

<sup>1</sup> University of Latvia, Latvia

## ABSTRACT

The aim of the present study was to explore the differences between mothers' and fathers' posttraumatic reactions and cognitions after preterm birth. According to Euro-Peristat data, premature births constitute an average of 6.9% of all live births in Europe and potentiate a severely stressful event for parents resulting in different posttraumatic reactions. In accordance with the posttraumatic stress cognitive model, negative cognitive appraisals are critical in sustaining of posttraumatic stress reactions and the development of posttraumatic stress disorder in parents following traumatic childbirth. Some research demonstrated evidence of different parental reactions – fathers showed a more delayed onset in their posttraumatic reactions, but, by 4 months, were at even greater risk than mothers. Therefore, psychological support for fathers was missed or even denied. In this study of the psychological effect of premature birth, mothers and fathers were asked to complete the Impact of Event Scale-Revised and Posttraumatic Cognitions Inventory. Data has been collected from 30 mothers and 24 fathers up to 18 months after birth. Fathers' and mothers posttraumatic reactions after the premature birth of the infant are significantly different during the time course where fathers showed lower posttraumatic reactions than mothers in the first months, then exceeded reactions of mothers around 7–12 months and equalized around 13–18 months. Differences in trauma-related cognitions for mothers and fathers were noted – fathers had significantly higher scores in the self-blame scale in six months since birth and higher scores in the negative cognitions about the world scale in the next six months. Collected data could help to plan and implement appropriate support for parents of preterm birth infants.

**Keywords:** *parents, posttraumatic reaction, posttraumatic stress disorder, premature birth, trauma-related cognitions.*

## Introduction

A full-term human pregnancy lasts 40 weeks. Delivery that occurs before 37 completed weeks of pregnancy is considered to be a preterm birth (World Health Organization [WHO], 2023). According to Euro-Peristat data, premature births constitute an average of 6.9% of

all live births in Europe (Euro-Peristat project, 2022). Approximately 15 million babies are born preterm annually worldwide, meaning that 1 in 10 babies are “born too soon” (Blencowe et al., 2013). In 2022, 910 babies were prematurely born in Latvia (Health Statistics Database, 2024). Unfortunately, the number continues to increase (WHO, 2023).

Globally, premature birth is the leading cause of death in children under the age of 5 years. Even though in recent years, mortality rates have decreased due to the development of advanced medical technology, improvements in perinatal care programs, and the establishment of neonatal intensive care unit (NICU), some of the prematurely born babies could have serious health issues, which would impact their further development and overall quality of life (Ohuma et al., 2023). Real and perceived risks by both parents during premature birth, to the health and life of the mother and the baby, uncertainty about the recovery and development of the baby, special care, are all significant sources of traumatic stress for the parents (Heyne et al., 2022; Ionio et al., 2016; Malouf et al., 2022).

As many studies show, some parents of premature infants develop posttraumatic stress disorder (PTSD; Laccetta et al., 2023; Misund et al., 2013; Schecter et al., 2020), which is a mental illness with debilitating symptoms such as intrusion symptoms (e.g., recurrent and intrusive distressing memories of the traumatic event, flashbacks, or nightmares), persistent avoidance of thoughts and activities that remind of the event, negative alterations in cognition and mood associated with the traumatic event, and hyperarousal (American Psychiatric Association [APA], 2013), but most of the parents display posttraumatic reactions (Gondwe & Holdith-Davis, 2015; Koliouli et al., 2016; Malouf et al., 2022).

Depending on the intensity of the trauma experienced by the parents, the recovery process and quality of life of the baby could be affected (Petit et al., 2016; Pierrehumbert et al., 2003). Most of the studies were directed towards the mother of the premature born baby. Over time came the realization about the importance of understanding the experience of fathers, that could have long-term effects on the psychological wellbeing of mothers and babies. However, the mental health of fathers has long been neglected and is still an underrepresented topic in this field of research (Singley & Edwards, 2015). Having summarized the results of different studies, Wong et al. (2016) emphasize the need to move the focus from research of psychological health of mothers towards a wider family perspective, including the fathers. As authors concluded, fathers are the mostly forgotten parent in perinatal mental care. A recent systematic review confirms this, where a total of 1,053 participants across 15 studies were included, 1,009 of whom were mothers and 44 were fathers of preterm newborns (Laccetta et al., 2023).

Findings regarding differences between the posttraumatic reactions of mothers and fathers of preterm birth are mixed. Comparing such reactions after 2–4 week time period after the baby is placed in the NICU, it was discovered that 44% of mothers had post-traumatic reactions that meet the criteria for acute stress disorders, but none of the fathers had such reactions (Shaw et al., 2006). A systematic review aimed to identify the prevalence of PTSD in mothers and fathers of high-risk infants admitted to the NICU (McKeown et al., 2023) discovered a wide variation of reported prevalence rates of PTSD

of 4.5–30% in mothers and 0–33% in fathers. Shaw et al. (2009) found that fathers, trying to be supportive to mothers, tend to express their stress later. Approximately 4 months after the preterm birth and the decrease of PTSD symptoms for the mothers, the reactions of the fathers increased and even exceeded that of the mothers (Shaw et al., 2009). It would be desirable to further study this difference, as much remains unclear.

In accordance with the posttraumatic stress cognitive model (Ehlers & Clark, 2000), negative posttraumatic cognitions play an important role in the development and upkeep of the post-traumatic reactions and PTSD (Ford et al., 2010), also called maladaptive cognitive appraisals (Gómez de La Cuesta et al., 2019). Negative posttraumatic cognitions include cognitions about the world, the self, and self-blame (Brown et al., 2019). The beliefs that the world is a dangerous place and the self is incompetent or somehow to blame for the trauma is not just one of the upkeep factors of PTSD, but also an important part of the PTSD symptom cluster as negative alterations in cognitions and mood according to The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; APA, 2013). These are the intervention targets, to prevent the development of PTSD or to reduce the intensity of posttraumatic reactions (Brown et al., 2019). It has been discovered that the greater negative posttraumatic cognitions, particularly about the self and the world, were associated with greater PTSD and psychiatric co-morbid symptoms (Gradl et al., 2023). Some studies have argued that self-blame was associated with a reduced risk of full-PTSD diagnosis and elevated PTSD symptoms (Startup et al., 2007). Additionally, King et al. (2017) showed that cognitive appraisal of traumatic childbirth explained an additional one-third of the variance in PTSD symptoms after accounting for personal and obstetric risk factors. Unfortunately, preterm birth infants parents posttraumatic cognitions and differences has not been fully investigated. A better understanding of preterm birth infants parents' trauma-related cognitions could help to create and provide parents with appropriate psychosocial support, because as it is well known, modification of cognitive appraisals in the treatment of PTSD played crucial role in the treatment of PTSD (Gradl et al., 2023; Wang et al., 2023).

The aim of this study is to explore differences between premature infants mothers' and fathers' posttraumatic reactions and trauma-related cognitions after the preterm birth. Thereby, the study was guided by following research questions:

1. Are there differences in mothers' and fathers' posttraumatic reactions in different time periods after the preterm birth?
2. Are there differences in mothers' and fathers' trauma-related cognitions in different time periods after the preterm birth?

## Methodology

### Participants

Invitation to participate in the study were sent to parents of preterm birth (gestational ages < 37 weeks) infants: 30 mothers and 30 fathers, who didn't receive any psychological intervention. Parents were included in the study no later than 18 months after childbirth.

**Table 1** Demographic and Medical Characteristics of the Samples

Characteristics	Mothers (n = 30)	Fathers (n = 24)
Age <i>M (SD)</i>	29.27 (6.20)	32.58 (6.91)
Level of education (%)		
Incomplete secondary	3.33	4.17
Secondary	10	16.66
Secondary special	20	12.5
Higher	66.67	66.67
Marital status (%)		
Single	3.33	0
Married	73.33	79.17
Living with partner	16.67	20.83
Divorced	6.67	0
Prematurity (weeks of gestational age) <i>M (SD)</i>	32.77 (3.08)	31.75 (2.61)
Type of labour (%)		
Natural	60	58.33
Caesarean section	40	41.67

The sample included 30 mothers and 24 fathers. The mean age of mothers was  $29.27 \pm 6.20$  years and of fathers  $32.58 \pm 6.91$  years. Majority of mothers (66.67%) and majority of fathers (66.67%) have a higher education. A total of 90% ( $n = 27$ ) of the mothers were married / cohabiting, and 3.33% ( $n = 1$ ) were singles. Among the fathers, 100% ( $n = 24$ ) were married/cohabiting. Child mean gestational age was 32.77 weeks in mothers' group and 31.75 weeks in fathers' group. Characteristics of the samples are summarized in Table 1. Fluent Latvian for parents was required.

## Measures

The demographics and clinical data questionnaire assessed information about the mother and father (e.g., age, marital status, level of education) and their infant (e.g., gestational age, date of birth).

Posttraumatic reactions were assessed with the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997). The IES-R is a widely used and validated screening tool for PTSD symptoms. This scale investigates posttraumatic symptoms that characterize parents after a potential traumatic event, in our case the premature birth. It is composed of 22 items, which respondents rated on a 5-point Likert scale ranging from 0 ("not at all") to 4 ("extremely"). Items according to main PTSD symptoms groups were formed in three subscales: 8 items regarding symptoms of avoidance (avoidance of feelings, situations, memories; e.g. "I tried not to think about it"), 7 items regarding symptoms of intrusion (flashbacks, nightmares, images; e.g. "Pictures about it popped into my mind"), and 7 items regarding symptoms of hyperarousal (fear, irritability, hypervigilance, and difficulties in concentration; e.g. "I was jumpy and easily startled"). Parents were asked to answer the questionnaire regarding the birth of their infant. The adapted IES-R Latvian version was used in this study. Cronbach's alpha reliability coefficients for all scales in Latvian were  $\alpha = 0.89$  (intrusion),  $\alpha = 0.89$  (avoidance),  $\alpha = 0.82$  (hyperarousal), and  $\alpha = 0.95$  (total score).

The Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999) is a 36-item measure of trauma-related thoughts and beliefs. PTCI assessed trauma-related cognitions in parents after preterm birth. PTCI items were rated on a 7-point Likert scale ranging from 1 (“totally disagree”) to 7 (“totally agree”). The scale assessed three dimensions of traumatic thoughts: negative cognitions about the self (including 21 items regarding general negative self-view, permanent change, alienation, hopelessness, self-trust and negative interpretation of symptoms, e.g. “*I am a weak person*”), negative cognitions about the world (including 7 items regarding an unsafe world and mistrust of other people, e.g. “*I have to be on guard all the time*”) and self-blame (including 5 items, e.g. “*The event happened because of the way I acted*”). The Latvian version of PTCI was used (Harlamova, 2014). Cronbach’s alpha reliability coefficients were calculated to be  $\alpha = 0.97$  (negative cognitions about the self),  $\alpha = 0.90$  (negative cognitions about the world),  $\alpha = 0.84$  (self-blame) and  $\alpha = 0.97$  (total score).

## Procedure

The research protocol was approved by the Ethics Committee of Pauls Stradiņš Clinical University Hospital (approval No. 270612-20L). The data for the research was collected online using QuestionPro survey software. The invitation to participate in the study was distributed with the help of neonatologists, family doctors, and the association of parents of premature babies. All parents of preterm infants provided an informed consent, and their anonymity was preserved. Parents were asked to complete demographic and clinical data questionnaire and self-report questionnaires measuring posttraumatic reactions and trauma-related cognitions.

Statistical analysis was performed using IBM SPSS Statistics Version 29.0. Descriptive and comparative statistics (t-test) were used.

## Results

In order to answer the first research question – Are there differences in mothers’ and fathers’ posttraumatic reactions in different time periods after the preterm birth? – comparisons were made by calculation of the t-criterion indicator. Certain significant differences in the IES-R scale were found (see Table 2). Posttraumatic reaction scores of fathers were lower and differed from mothers within 1–6 month time span: intrusion ( $t(25) = 4.42, p < 0.001$ ), hyperarousal ( $t(25) = 2.92, p < 0.01$ ), avoidance ( $t(25) = 2.07, p < 0.05$ ). On the contrary, scores were higher and differed within 7–12 month interval: avoidance ( $t(15) = -3.58, p < 0.01$ ), intrusion ( $t(15) = -2.28, p < 0.05$ ). There were statistically different IES-R total scores for mothers and fathers in the first six months ( $t(25) = 3.28, p < 0.01$ ) and in the following six months ( $t(15) = -2.76, p < 0.05$ ). The scores were not different a year after childbirth.

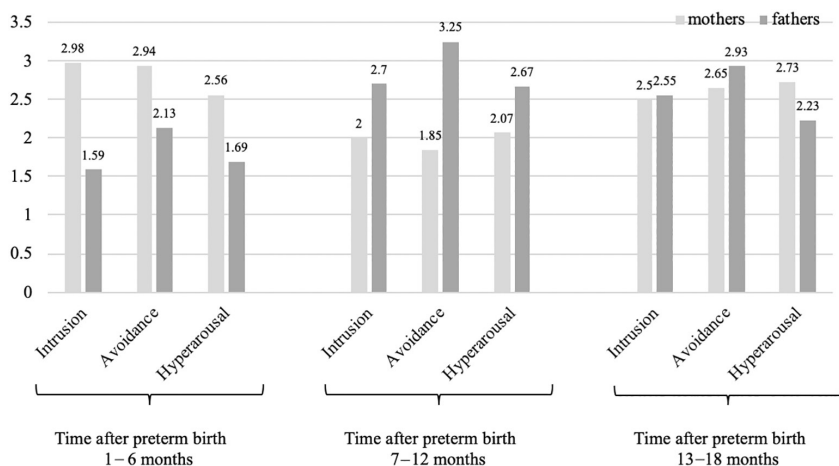
**Table 2** Comparison of Mean IES-R and PTCI Scores of Mothers and Fathers in Different Stages after Premature Birth (t-test)

Variables			Time (months) 1–6		<i>t</i>	Time (months) 7–12		<i>t</i>	Time (months) 13–18		<i>t</i>
	Mothers <i>n</i> = 30	Fathers <i>n</i> = 24	Mothers <i>n</i> = 15	Fathers <i>n</i> = 12		Mothers <i>n</i> = 10	Fathers <i>n</i> = 7		Mothers <i>n</i> = 5	Fathers <i>n</i> = 5	
<b>IES-R total</b>											
<i>M</i>	51.27	50.42	62.73	39.92	3.28 **	43.20	63.57	-2.76 *	57.80	57.20	0.04
( <i>SD</i> )	(17.33)	(16.40)	(19.76)	(15.33)		(11.39)	(19.19)		(23.25)	(19.23)	
Intrusion											
<i>M</i>	2.38	2.19	2.98	1.59	4.42 ***	2.00	2.70	-2.28*	2.53	2.55	-0.04
( <i>SD</i> )	(0.79)	(0.78)	(0.91)	(0.66)		(0.51)	(0.76)		(1.01)	(1.03)	
Avoidance											
<i>M</i>	2.32	2.60	2.94	2.13	2.07*	1.85	3.25	-3.58**	2.65	2.93	-0.43
( <i>SD</i> )	(0.98)	(0.85)	(1.13)	(0.86)		(0.68)	(0.94)		(1.05)	(0.97)	
Hyperarousal											
<i>M</i>	2.28	2.09	2.56	1.69	2.92**	2.07	2.67	-1.35	2.73	2.23	0.72
( <i>SD</i> )	(0.88)	(0.65)	(0.85)	(0.62)		(0.72)	(1.12)		(1.45)	(0.58)	
<b>PTCI total</b>											
<i>M</i>	93.07	101.46	105.47	102.58	0.18	75.50	104.57	-2.05	91.00	94.40	-0.14
( <i>SD</i> )	(38.76)	(36.54)	(41.96)	(42.13)		(29.91)	(26.95)		(36.91)	(40.31)	
NCS											
<i>M</i>	2.94	2.82	3.44	2.81	1.13	2.36	2.94	-1.20	2.59	2.69	-0.13
( <i>SD</i> )	(1.40)	(1.12)	(1.56)	(1.31)		(1.07)	(0.81)		(1.12)	(1.23)	
NCW											
<i>M</i>	2.61	3.31	2.83	3.01	-0.35	1.96	3.54	-3.42*	3.29	3.63	-0.41
( <i>SD</i> )	(1.22)	(1.35)	(1.32)	(1.44)		(0.81)	(1.36)		(1.19)	(1.47)	
Self-blame											
<i>M</i>	2.60	3.81	2.67	4.50	-2.72*	2.44	3.54	-2.06	2.72	2.52	0.23
( <i>SD</i> )	(1.39)	(1.72)	(2.67)	(1.83)		(0.85)	(1.36)		(1.60)	(1.18)	

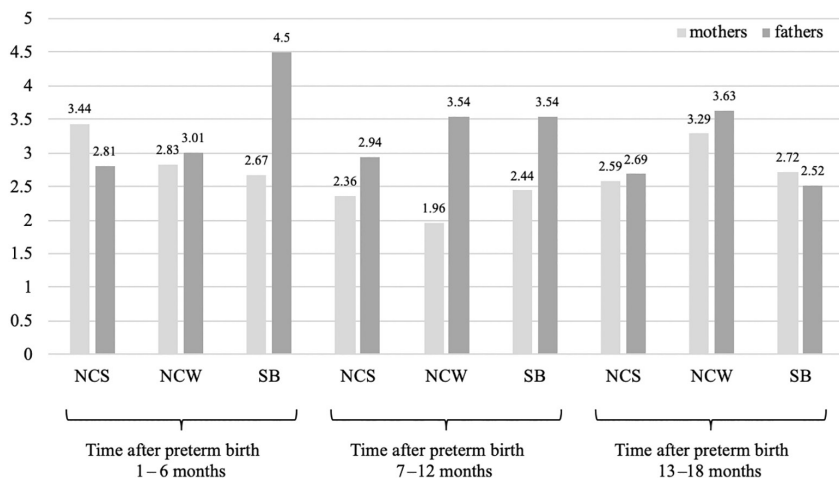
Note. NCS – Negative cognitions about the self, NCW – Negative cognitions about the world.

\*  $p < 0,05$ . \*\*  $p < 0,01$ . \*\*\*  $p < 0,001$ .

Collected results create certain posttraumatic reaction patterns of fathers and mothers (see Figure 1). Mothers show higher posttraumatic reaction scores than fathers in the first stage after preterm birth (1–6 months), however, fathers show higher scores than mothers in the second stage after preterm birth (7–12 months). The scores for both are equal in the third stage (13–18 months).



**Figure 1** IES-R Scores Mothers and Fathers at Different Stages after Preterm Birth



**Figure 2** PTCI Scores of Mothers and Fathers at Different Stages after Preterm Birth

Note. NCS – negative cognitions about the self; NCW – negative cognitions about the world; SB – self-blame.

In order to answer the second research question – Are there differences in mothers' and fathers' trauma-related cognitions in different time periods after the preterm birth? – comparisons were made by calculation of the t-criterion indicator. Significant differences were found between mothers and fathers in PTCI scores (see Table 2): fathers showed significantly higher results in the self-blame scale score ( $t(25) = -2.72, p < 0.05$ ) within 1–6 month time span after preterm birth and in negative cognitions about the world scale score ( $t(15) = -3.42, p < 0.05$ ) within 7–12 month time span. Other PTCI results do not statistically differ.

Similarly to differences between posttraumatic reactions in both parents, the differences between mothers and fathers in trauma-related cognitions are found only in the first year after the birth (see Figure 2). Fathers show higher self-blame scale scores

than mothers in the first stage after preterm birth even while having lower posttraumatic scores than mothers. However, in the second stage, when posttraumatic reactions of fathers exceed those of the mothers, the fathers had a higher scale score about negative cognitions about the world than the mothers.

## Discussion

The aim of this study was to illustrate the psychological effect of premature birth of their infant on parents, evaluating potential differences between premature infants mothers' and fathers' posttraumatic reactions and trauma-related cognitions in different time periods after the preterm birth.

This study confirms that mothers' and fathers' posttraumatic reactions after preterm birth were significantly different in the 18-month time span. Results of the self-assessment posttraumatic reactions of fathers were lower than mothers' in the first few months after the birth, then exceeded mothers' results in 7–12 months, and the scores equalized in the 13–18 months. Obtained data matches another study (Shaw et al., 2009), in which a slightly delayed onset of symptoms in fathers, as compared with mothers, had been observed. Shaw et al. (2009) hypothesized that fathers “delay” their own emotional response during the first months, when mothers may be more physically and emotionally vulnerable and in need of support from their partners. This assumption in turn matches the data of qualitative researches about fathers of preterm infants, revealing that fathers often tried to fit the role of the strong postpartum partner and hid their own needs, or avoided showing their own worries and feelings as the most common way of protecting their partners from further upheavals (Hagen et al., 2016; Stefana et al., 2022).

Regardless of the later manifestation of fathers' posttraumatic reactions comparing to mothers', obtained results allow to suggest possible risk that fathers' reactions could be unnoticed or neglected and not properly evaluated. Fathers may not display posttraumatic reactions if those are measured in the first months after birth, leading to the assumption that they cope easier than mothers and don't perceive the event as traumatic. Therefore, fathers may lack emotional support which might impact further reactions. Furthermore, late posttraumatic reactions may cause confusion for both partners, especially if spouses' reactions start to diminish, which could fuel couple conflicts and lead to separation or divorce (Baldoni et al., 2021).

Simultaneously, the study showed that parents' trauma-related cognitions varied across different periods. Self-blame scores of fathers significantly exceeded scores of mothers in the first six months after birth, and negative cognitions about the world scores of fathers significantly exceeded scores of mothers' in 7–12 months. It is well established that negative cognitions related to the world and to the self have been seen as important in the development and maintenance of PTSD symptoms after trauma (Gradl et al., 2023). In turn, the role of cognitions related to self-blame is not unequivocally clear. One part of the research regarding self-blame in PTSD more conceptualizes it as a maladaptive coping strategy rather than a part of cognitive appraisal of the trauma and predictor



of PTSD. The other part took the perspective that self-blame constitutes an ongoing appraisal of one's role relative to the event or situation rather than a coping response (Sinnott et al., 2022). Additionally, research on self-blame suggests that in PTCI measure two types of self-blame – characterological self-blame and behavioral self-blame (e.g., “The event happened to me because of the sort of person I am” and “The event happened because of the way I acted”) and each of them has differential relationships to psychological outcomes (Startup et al., 2007). It is believed that behavioral self-blame, which involves attributing the cause of traumatic experiences to controllable or modifiable aspects of oneself, such as specific actions, leads to less posttraumatic distress and provides an internal sense of control over future outcomes (Startup et al., 2007; Raz et al., 2023). Further research for better understanding of fathers' self-blame after birth in the first months and their connections with posttraumatic reactions is needed.

Overall data obtained provide the possibility to recognize parental differences in trauma-related cognitions elaborating PTSD prevention program. Results of the research can provide a framework for the development of psychoeducational materials for parents after preterm birth, including information about self-blame cognitions, their forms and how they may influence parental emotions and behavior. Another aspect is to bring attention to self-blame in the psychological assessment of these parents. Reestablishing a sense of control may be important for all who experienced such trauma, but even more important for individuals high in self-blame (Raz et al., 2023). Therefore, intervention strategies for parents may be particularly helpful for individuals with self-blame and increasing perceived control after trauma, for instance, cognitive coping strategies that utilize compassionate self-talk, positive reinterpretation, and acceptance (Sinnott et al., 2022).

There are several limitations to consider in the current study, resulting in suggestions for future research. Firstly, the results should be interpreted with caution because the samples were small, making it difficult to draw strong conclusions. An important next step would be to include more participants in order to better understand our results. Secondly, the samples consisted of volunteers and it is likely that those with interest in research, reflecting on the experience of preterm childbirth, or their mental health, were more likely to participate in the survey. However, there is a possibility that participants with PTSD symptoms could avoid any reminders of their trauma, therefore not taking part in any research about traumatic experience or diminishing the extent of their symptoms. Finally, the use of only self-report questionnaires to assess posttraumatic reactions and trauma-related cognitions is a further limit. It will be important to include measures such as structured clinical interviews in further research. Moreover, in order to better explain our findings and further explore fathers' experiences, it would be valuable to consider the use of qualitative methods.

Despite the limitations, this study allowed insight into how fathers react and evaluate the experience of the premature birth of their child and suggests that certain differences do exist between the posttraumatic reactions among fathers and mothers. However, the findings would need to be investigated further, to ensure more precise psychological

assistance for preterm birth parents and to diminish potential negative psychological outcomes in the future.

Incorporating regression analysis could enhance the understanding of the explanatory roles of cognitions, gender, and time-related influences, making it a valuable addition to subsequent research efforts.

## Conclusion

The present study investigated differences between mothers and fathers, and compared them in regard to posttraumatic reactions and trauma-related cognitions after preterm birth. In summary, the findings from the present study point to the differences between mothers' and fathers' posttraumatic reactions and trauma-related cognitions in the first year after preterm birth. It is hoped that with a greater understanding of this difficult period for parents and men, professionals will be able to further research and practice interventions that will take the differences with this population into account.

## Author Note

We would like to express our deepest gratitude to all parents who participated in this study, and extend a special thanks to Professor Sandra Sebre for her invaluable contribution to the implementation of the research idea.

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