JOURNAL OF REPRODUCTIVE AND INFANT PSYCHOLOGY
https://doi.org/10.1080/02646838.2025.2497401

Post-traumatic stress symptoms, rumination, and posttraumatic growth in women with a traumatic childbirth experience

Wilson Abreu[a], Sónia Brandão[a], Tânia Brandão[b], Ana Paula Prata[a], Rosa Silva[a], Olga Riklikiene[c], Gabija Jarasiunaite-Fedosejeva[d], Ernesto S. González Mesa[e], Gözde Gökçe İsbir[f], Figen Inci[g], Burku Komurcu Akik[h], Kristiina Uriko[i], Tatiana Governo[j] and Gill Thompson[k]

[a]RISE-Health, Nursing School of Porto, Rua Dr. António Bernardino de Almeida 830/844/856, 4200-072, Porto, Portugal; [b]William James Center for Research, Ispa – Instituto Universitário, Lisboa, Portugal; [c]Faculty of Nursing, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania; [d]Department of Psychology, Faculty of Social Sciences, Vytautas Magnus University, Kaunas, Lithuania; [e]Department of Surgical Specialties, Biochemistry and Immunology, University of Malaga, Instituto de Investigación Biomédica de Málaga y Plataforma en Nanomedicina (IBIMA-Plataforma BIONAND), Research Group in Maternal-Fetal Medicine, Epigenetics, Women's Diseases and Reproductive Health, Spain; [f]Midwifery Department, Faculty of Health Sciences, Mersin University, Yenişehir, Mersin, Turkey; [g]Niğde Ömer Halisdemir University Zübeyde Hanım Faculty of Health Sciences, Psychiatric Nursing Department, Nigde, Turkey; [h]Department of Psychology, Faculty of Language, History and Geography, Ankara University, Ankara, Turkey; [i]School of Natural Sciences and Health, Tallinn University, Tallinn, Estonia; [j]Departamento da Mulher e da Medicina Reprodutiva, Centro Materno Infantil do Norte Albino Aroso, Centro Hospitalar Universitário de Santo António, Unidade Local de Saúde de Santo António, Porto, Portugal; [k]Maternal, Parental and Infant Nutrition & Nurture research unit, School of Community Health and Midwifery, University of Central Lancashire, Preston, United Kingdom

ABSTRACT

Background: Rumination can either prolong distress or foster growth following traumatic experiences like childbirth. This study investigates the association between post-traumatic stress symptoms and post-traumatic growth in women who underwent traumatic childbirth, examining the potential mediating role of two types of rumination – intrusive and deliberate.

Methods: A cross-sectional study in Northern Portugal from January 2020 to December 2021 surveyed 202 women with infants under 12 months, self-reporting traumatic childbirth experiences. Instruments included the City Birth Trauma Scale, Event-Related Rumination Inventory, and Post-traumatic Growth Inventory.

Results: Women experienced various childbirth-related traumatic events, with most showing post-traumatic stress symptoms for over three months. Approximately 60% met post-traumatic stress disorder criteria.

The results indicate that post-traumatic stress symptoms were positively correlated with post-traumatic growth, and both showed positive associations with intrusive rumination and deliberate rumination. Mediation analysis revealed deliberate rumination significantly

ARTICLE HISTORY

Received 5 August 2024
Accepted 18 April 2025

KEYWORDS

Traumatic birth; post-traumatic stress symptoms; rumination; post-traumatic growth; women's health

CONTACT Sónia Brandão soniabrandao@esenf.pt RISE-Health, Nursing School of Porto, Rua Dr. António Bernardino de Almeida 830/844/856, 4200-072, Porto, Portugal

mediated post-traumatic stress symptoms and post-traumatic growth, highlighting its role in trauma outcomes.
Conclusions: This study illuminated the pathway through which post-traumatic stress symptoms can lead to posttraumatic growth, highlighting the pivotal role of deliberate rumination in this association. This finding is essential for tailoring therapeutic interventions that effectively foster post-traumatic recovery and resilience, underscoring the importance of promoting deliberate rumination.

Introduction

Childbirth is an intense physical and emotional experience in the life of any women. It is a normative and predictable event, and it is expected to be a positive experience for the mothers (Brandão et al., 2020). The World Health Organization underscores the significance of a favourable childbirth experience, given that adverse encounters can precipitate enduring and severe mental health complications (World Health Organization, 2018. Nevertheless, adverse situations may arise that are interpreted by women as traumatic. A traumatic childbirth experience refers to a parent's experience of interactions and/or events directly related to childbirth that caused overwhelming distressing emotions and reactions, leading to short- and/or long-term negative impacts on health and well-being (Leinweber et al., 2022; Shorey & Wong, 2022; Watson et al., 2021).

It has been suggested that between 20% and 48% of women experience a traumatic birth (McKelvin et al., 2021). A traumatic birth can lead to post-traumatic stress symptoms (PTS symptoms) or post-traumatic stress disorder (PTSD) (Ayers et al., 2024; Ertan et al., 2021; Pop-Jordanova, 2022).

PTS symptoms affect women differently in different societies, with rates being elevated in high-risk populations (Caparros-Gonzalez et al., 2021; Ketley et al., 2024; Khoramroudi, 2018). There is some evidence which suggests that risk factors for childbirth trauma include unexpected medical problems such as emergency caesarean section, forceps delivery, vacuum extraction, epidural analgesia, episiotomy, and poor perceived control in labour. These factors, namely the type of childbirth (vaginal, instrumental, or caesarean), are likely to contribute to the development of PTSD (Dekel et al., 2020; Garthus-Niegel et al., 2014; Hernández-Martínez et al., 2020; Martinez-Vázquez et al., 2021).

A positive outcome of trauma is growth, specifically post-traumatic growth (PTG), which is a transformative process involving psychological changes and personal development (Dickinson, 2021; Tedeschi et al., 2018). PTG enables individuals to surpass their pre-trauma functioning, arising from the struggle to overcome adversity and influenced by self-compassion and effective coping strategies like active problem-solving (Henson et al., 2021; Ketley et al., 2024; Malhotra & Chebiyan, 2016).

PTG, as conceptualised by Tedeschi and Calhoun (1996, 2004), refers to positive psychological changes that can occur following the struggle with traumatic events. It includes five dimensions: appreciation of life, relating to others, personal strength, new possibilities, and spiritual change. These dimensions reflect the ways in which individuals may grow after trauma, such as developing deeper personal relationships (relating to others), a greater sense of gratitude for life (appreciation of life), discovering new life

paths or opportunities (new possibilities), or gaining inner strength and resilience (personal strength). PTG is not merely a resolution of distress but a process where trauma and growth co-exist, allowing for both the persistence of negative emotions and the emergence of positive change (Tedeschi & Calhoun, 1996, 2004).

PTG and PTSD often coexist, as individuals may simultaneously experience ongoing distress and report positive changes following trauma. This coexistence is supported by models such as Maercker and Zoellner's (2004) two-component model, which differentiates genuine growth – marked by functional adjustment and cognitive restructuring – from illusory growth, characterised by self-deceptive coping strategies (Zoellner & Maercker, 2006). Such dynamics have been observed across various types of traumas, including natural disasters and medical emergencies, like childbirth trauma (Brandão et al., 2020; Dell'osso et al., 2022; Henson et al., 2021; Sawyer et al., 2012; Thomson, 2017).

However, not all individuals experience growth in all five dimensions, and the manifestation of growth may vary based on personal and cultural factors. The relationship between PTG and post-traumatic stress, lies in how individuals cognitively process their traumatic experiences, which can lead to both ongoing distress and opportunities for growth (Dell'osso et al., 2023; Tedeschi & Calhoun, 2004). Nevertheless while PTG is often reported as a positive outcome following trauma, it is important to acknowledge the criticism of the PTG model, which suggests that growth can manifest in two forms: genuine growth, which reflects functional adjustment and cognitive restructuring, and illusory growth, which involves self-deceptive coping strategies such as avoidance or denial (Boals, 2023; Wortman, 2004; Zoellner & Maercker, 2006).

Childbirth, although a natural process, can sometimes result in trauma, leading not only to PTS symptoms but also to opportunities for growth (Watson et al., 2021). Studies suggest that some women, despite experiencing traumatic births, report positive psychological changes such as increased resilience, a stronger sense of identity, or more profound relationships with their partners (Berman et al., 2021; Brandão et al., 2020; Thomson, 2017). Resilience has been strongly associated with overall PTG, showing a stronger link with PTG and most of its factors, namely optimism (Ketley et al., 2024). However, resilience and PTG are distinct constructs; while resilience involves returning to normal functioning after adversity, PTG reflects transformative changes in functioning or beliefs that extend beyond pre-trauma levels, including improved relationships, personal strength, spiritual development, new possibilities in life, and a greater appreciation of life (Tedeschi et al., 2018; Zlotnick & Manor-Lavon, 2023).

In exploring the factors that contribute to these positive changes, it is essential to consider the cognitive processes involved in coping with trauma. One such process is rumination, which plays a crucial role in determining whether individuals experience growth following traumatic events. Rumination is a form of cognitive processing and is a pre-requisite for growth to occur (Taku et al., 2009). Rumination refers to the tendency to repetitively dwell on negative thoughts and feelings, often related to a traumatic experience. Intrusive thoughts about the traumatic event are likely to be associated with continued distress and persistent suffering, while deliberate rumination, aimed at understanding and problem-solving, can enable growth and change to occur (Cann et al., 2011). Rumination is therefore a deliberate process, in which an individual actively chooses to think about the traumatic event, or it can be an intrusive process, in which thoughts and feelings about the trauma arise involuntarily.

Deliberate rumination is therefore identified as a helpful tool in promoting PTG, as it allows individuals to process and make sense of their experience, as found in previous studies (Lindstrom et al., 2013; Miethe et al., 2023; Triplett et al., 2012; Zhou et al., 2015).

While intrusive rumination may hinder recovery by increasing distress and impairing functioning, deliberate rumination offers a contrasting pathway, potentially fostering growth. Some studies have found no association between intrusive rumination and PTG (e.g. Cordova et al., 2007; Morris & Shakespeare-Finch, 2011), but research specifically focused on women who have experienced traumatic childbirth remains limited. Nevertheless, rumination, both intrusive and deliberate, plays a critical role in post-trauma outcomes, with deliberate rumination facilitating cognitive processing that can lead to growth (Brandão et al., 2020; Moulds et al., 2020; Tomsis et al., 2018). Given that women who experience childbirth-related trauma often engage in significant mental processing of their experiences, we hypothesise that rumination mediates the relationship between PTS symptoms and PTG.

This study aims to investigate the correlation between post-traumatic stress symptoms (PTS symptoms) and post-traumatic growth (PTG) in women who have experienced traumatic childbirth, as well as the potential mediating role of rumination, both intrusive and deliberate, in this association. In addition, this study also aims to explore whether the type of childbirth (vaginal, instrumental, or caesarean) influences the severity of PTS symptoms.

Methods

This study adhered to the stringent reporting criteria delineated in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cohort studies. It constitutes one of five sub-studies conducted within a broader project conducted under the auspices of an EU COST Action.

Study design

A cross-sectional study was carried out in the North of Portugal from April 2020 to December 2021.

Ethical considerations

The study received approval from the Research Ethics Committee of Escola Superior de Enfermagem do Porto (Reference 2019–530, from 2019.12.17). All procedures were authorised by this institutional review board in accordance with ethical and data protection standards. Written informed consent was obtained from individuals for the publication of any potentially identifiable images or data included in this article. Women whose participation in the study could potentially interfere with their clinical situation were excluded. Participants were informed of their right to withdraw from the study at any time without any adverse consequences.

Participants

Women who had given birth in hospitals in northern Portugal were recruited using a snowball method. The inclusion criteria for women in the study were as follows: (1) self-reported traumatic childbirth experience; (2) having a live newborn at least one month old; (3) the time elapsed since the traumatic childbirth event was between 1 and 12 months. Women whose newborn died during the first month after childbirth and those with health conditions (such as cognitive impairments) that precluded participation in a survey were excluded.

The survey began by asking participants if they had undergone a distressing or traumatic event during childbirth. Those who answered in the affirmative were eligible to proceed with the study, those who responded negatively were redirected to a 'thank you' page and did not proceed further.

The final number of participants who completed the survey was 202.

Measures

The survey consisted of four sections: (a) participants' demographic and clinical information form; (b) The City Birth Trauma Scale (CBS), the Event-Related Rumination Inventory (ERRI), the Post-traumatic Growth Inventory (PTGI), detailed as follows:

Participants' demographic and clinical information included age, place of residence, education, job status, marital status, number of children, income, significant previous illnesses, parity (primiparous or multiparous), pregnancy planning, pregnancy surveillance, type of childbirth, place of childbirth, problems during childbirth (for the mother or the child), significant negative events that took place in the last five years, identification of the lived trauma, how long the psychological reactions to the trauma lasted, if there was any impairment on daily activities, support from health professionals during the period in which the symptoms lasted, level of stress felt after the traumatic event occurred during childbirth (trauma-related self-report).

The City Birth Trauma Scale (CBS) (Ayers et al., 2018) has 29 questions that measure PTSD symptoms according to the diagnostic criteria of the DSM-5 published by the American Psychiatric Association (2022). Items are rated on a four-point Likert scale from 0 (never) to 3 (5 or more times) to produce a sum score ranging from 0 to 60, with higher scores indicating elevated levels of PTS symptoms. The scale was translated to Portuguese and validated in Portugal and Brazil (Osório et al., 2022), with a calculated Cronbach's alpha of 0.91. In the present study, the scale's internal consistency was high (Cronbach alpha was 0.95). Regarding the subscales, we obtained Cronbach alpha values of 0.92 for Re-experiencing, 0.88 for Avoidance, 0.92 for Negative mood and 0.92 for Hyperarousal.

Event-Related Rumination Inventory (ERRI) (Cann et al., 2011) is an instrument that allows tracking cognitive processing after a highly significant life event. It is used to assess the levels of the two rumination styles (intrusive and deliberate rumination) in individuals who have experienced a highly stressful event. Comparing the values in both styles, it is possible to determine the individual's dominant cognitive processing style (Cann et al., 2011). The ERRI includes two subscales that contain ten statements relevant to either intrusive rumination or deliberate rumination. Subscale scores are calculated by summing

up the scores of all the items in each subscale, resulting in separate scores for intrusive and deliberate rumination. The instrument was translated and validated in Portuguese (Ramos et al., 2015), with a calculated Cronbach's alpha of 0.96. In the current study, the internal consistency of subscales was quite high. Cronbach's alpha was 0.96 for intrusive rumination and 0.91 for deliberate rumination.

Post-traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) is an instrument for assessing positive outcomes following traumatic events. The 21-item scale includes factors to measure New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. The instrument was translated and validated in Portuguese by Silva et al. (2009). The analysis of the internal consistency of the version validated for the Portuguese population using Cronbach's alpha coefficient showed a value of 0.95 for the total scale. In the current study, Cronbach alpha was 0.92 for relating to others, 0.82 for personal strength, 0.83 for new possibilities, 0.54 for spiritual change, and 0.82 for appreciation of life.

Data analysis

SPSS (version 28) was used to analyse the data. First, descriptive statistics were computed to provide an overview of participants' sociodemographic and clinical variables as well as the study variables. Then, Pearson correlation between the main study variables was examined to assess the strength and direction of the associations.

In addition, ANOVA analyses were performed to examine differences in PTS symptoms (specifically, re-experiencing, avoidance, negative cognitions and mood, and hyperarousal) across different types of childbirth (i.e. vaginal, vaginal with forceps/vacuum, and caesarean section).

Finally, a mediation analysis using Model 4 of the PROCESS macro (version 4.1) developed by Hayes (2013) for SPSS was conducted. This model assessed the mediating role of rumination (both intrusive and deliberate) in the relationship between PTS symptoms and PTG. To evaluate the significance of the indirect effects, 95% confidence intervals (CI) were computed using bootstrapping. Indirect effects were deemed significant at the 0.05 level if the lower and upper bounds of the CI did not include zero (Hayes, 2013).

Results

Sample characteristics

Participants' sociodemographic and childbirth related characteristics are shown in Table 1. The mean age of women was 33.7 ± 4.82 years. Most women had completed a bachelor (44.6%) or master's degree (27.7%). Half of women reported being married (56.4%), and 84.2% were employed.

Most women reported not having significant previous illnesses (84.2%), had a planned pregnancy (76.2%) and 66.3% were primiparous. Regarding the type of childbirth, there were a variety of situations: vaginal birth (11.4%), vaginal with forceps or vacuum (51.5%), and caesarean section (37.1%).

The situations indicated as traumatic were (in order of reported frequency): perineal trauma (27.7%), the unexpected change in the type of childbirth (22.8%),

Table 1. Sociodemographic and childbirth related characteristics ($N = 202$).

Characteristics		(n)	(%)
Sociodemographic			
Education	Complete basic school	7	3.5%
	Complete secondary school	33	16.3%
	Bachelor's degree or more	162	80.2%
Marital status	Single	10	5%
	Married/non-marital partnership	188	93%
	Divorced	4	2%
Occupation status	Employed	170	84.2%
	Unemployed	32	15.8%
Previous Medical History			
Significant prior illness	No	170	84.2%
	Yes	32	15.8%
Obstetric			
Parity	Primiparous	134	66.3%
	Multiparous	68	33.7%
Pregnancy planning	Planned	154	76.2%
	Not planned	48	23.8%
Childbirth Type	Vaginal	23	11.4%
	Vaginal with forceps or vacuum	104	51.5%
	Caesarean	75	37.1%
Childbirth Trauma Events			
Related to infant conditions	Health problems (including prematurity)	28	13.9%
Related to delivery problems	Perineal trauma	56	27.7%
	Change in type of delivery	46	22.8%
	Use of forceps	27	13.4%
Related to loss of control during labour	Lack of pain control during labour	23	11.4%
	Interdiction of partners' presence in the delivery room	18	8.9%
	Parturient unexpected health problem	4	2%
Self-perceived stress during childbirth	Not stressful	13	6.4%
	Little stressful	13	6.4%
	Quite stressful	4	2%
	Very stressful	29	14.4%
	Extremely stressful	143	70.8%
Duration of stress symptoms	Less than a month	51	25.2%
	One to three months	36	17.8%
	More than three months	115	56.9%
Fear for own health during childbirth	Yes	51	25.2%
	No	36	17.8%
Fear for baby's health during childbirth	Yes	51	25.2%
	No	36	17.8%

baby's health problems (including preterm) (13.9%), use of forceps/vacuum (13.4 %), lack of pain control during childbirth (11.4 %), and lack of birth companion presence (8.9 %). The women were also asked to indicate the level of stress that the experience of the trauma caused: 70.8% indicated 'Extremely stressful' and 14,4% 'Very stressful'. Most of the women had PTSD symptoms for more than three months (56.9%). Concerning possible fears at childbirth, 56.4% reported fear about their own health and 50.5% about the baby's health.

In this sample, 60.4% of women met the criteria for a PTSD diagnosis following a traumatic childbirth. The assessment of the rumination processes revealed that the dominant style for women under the study was intrusive (73.3%) (Table 2).

Table 2. Descriptive statistics of the main variables ($N = 202$).

	(n)	Range	Minimum	Maximum	Mean
PTS Symptoms					
Re-experiencing	202	0–15	0	15	9.79 (2.37)[a]
Avoidance	202	0–6	0	6	3.39 (1.30)[a]
Negative mood and cognition	202	0–21	0	21	12.47 (3.71)[a]
Hiperarousal	202	0–18	0	18	3.39 (1.10)[a]
Total PTDS symptoms	202	0–60	0	60	36.34
PTSD (DSM-5)	(n)		%		
No	80		39.6		
Yes	122		60.4		
	(n)		Minimum	Maximum	Mean
Post-traumatic growth					
Relating to others	202	0–35	0.00	30.00	13.48
New-possibilities	202	0–25	3.00	25.00	11.98
Personal-strength	202	0–20	1.00	20.00	10.27
Spiritual change	202	0–10	1.00	10.00	4.17
Appreciation of life	202	0–15	3.00	15.00	8.64
Rumination styles	(n)		%		
Intrusive rumination	148		73.3		
Deliberate rumination	54		26.7		
	(n)		Minimum	Maximum	Mean
Rumination and styles of rumination					
Intrusive rumination	202	0–30	0	30	22.56
Deliberate rumination	202	0–30	0	30	16.22

a) values calculated in validation to the Portuguese context by Gonçalves (2020)

Table 3. PTS symptoms and type of childbirth.

PTSD symptoms	Type of childbirth	M (SD)	F
Re-experiencing	Vaginal	9.21 (5.83)	1.985
	Vaginal (forceps/vacuum)	9.26 (5.12)	
	Caesarean	10.69 (4.35)	
Avoidance	Vaginal	2.82 (2.63)	3.218*
	Vaginal (forceps/vacuum)	3.12 (2.43)	
	Caesarean	3.94 (2.34)	
Negative mood and cognition	Vaginal	10.86 (7.42)	1.888
	Vaginal (forceps/vacuum)	12.00 (7.32)	
	Caesarean	13.61 (5.46)	
Hiperarousal	Vaginal	10.26 (6.53)	3.510*
	Vaginal (forceps/vacuum)	9.79 (6.22)	
	Caesarean	12.07 (4.69)	
Total PTSD symptoms	Vaginal	33.17 (21.23)	2.781
	Vaginal (forceps/vacuum)	34.18 (19.74)	
	Caesarean	40.32 (15.58)	

Note. M = mean; SD = standard deviation; *$p < .05$

PTDS Diagnosys	Type of childbirth	$N = 122/202$ (60.4%)
	Vaginal	15 (12.3%)
	Vaginal (forceps/vacuum)	57 (46.7%)
	Caesarean	50 (41.7%)
Total		122 (100%)

Table 4. Associations between posttraumatic stress symptoms, post-traumatic growth and rumination.

	1	2	3
1. PTS symptoms	1		
2. Posttraumatic growth	.157*	1	
3. Intrusive rumination	.623**	.202*	1
4. Deliberate rumination	.400**	.335**	.466**

**$p < .001$; *$p < .05$.

Assessment of post-traumatic stress symptoms (PTS symptoms), post-traumatic growth (PTG) and the rumination process

The results indicate that women who underwent instrumental delivery (forceps/vacuum) reported the highest prevalence of PTS symptoms, with 46.7% (57 out of 122) affected (Table 3). ANOVA analysis revealed significant differences in the means for the Avoidance ($p = 0.004$) and Hyperarousal ($p = 0.03$) dimensions.

The associations between rumination and post-traumatic stress symptoms (PTS symptoms) and post-traumatic growth (PTG)

The results indicate that PTS symptoms were positively, though weakly, correlated with PTG ($r = 0.157$, $p < 0.05$). Both, PTSD and PTG showed positive associations with intrusive rumination, with a strong correlation between PTSD and intrusive rumination ($r = 0.623$, $p < 0.001$) and a weak correlation between PTG and intrusive rumination ($r = 0.202$, $p < 0.05$). Similarly, PTSD was moderately correlated with deliberate rumination ($r = 0.400$, $p < 0.001$), while PTG had a weak-to-moderate association with deliberate rumination ($r = 0.335$, $p < 0.001$) (Table 4).

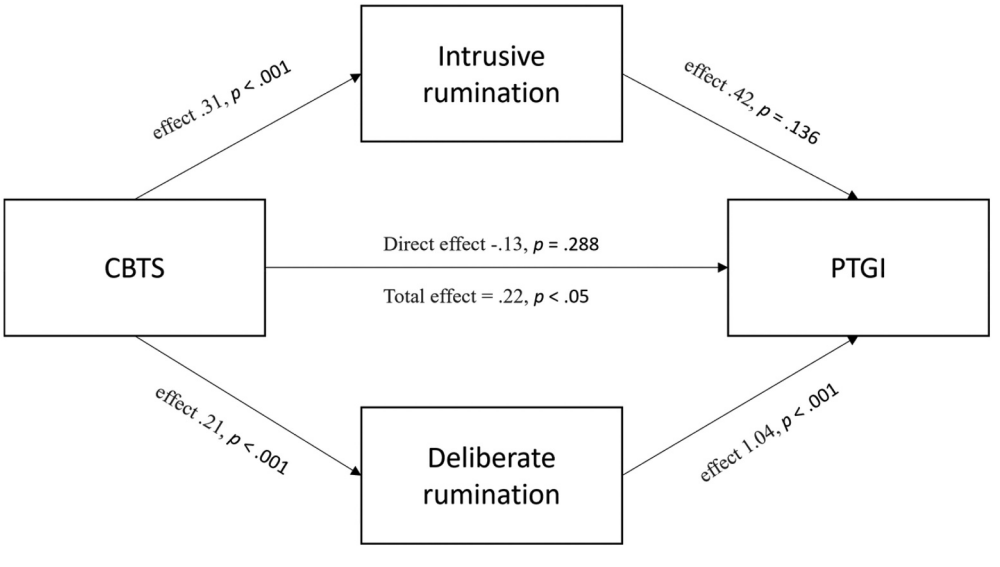

Figure 1. Mediating role of rumination in the association between post-traumatic stress symptoms and post traumatic growth.

Table 5. The importance of rumination for the relationship between post-traumatic stress symptoms and post-traumatic growth.

Predictors	B	β	Est./S.E.	t	95% CI	p value
			Intrusive rumination			
PTS symptoms	0.266	0.623	0.024	11.263	[0.219;0.312]	<0.001
F				126.856		
R^2				0.388		
			Deliberate rumination			
PTSD symptoms	0.185	0.400	0.030	6.179	[0.126;0.244]	<0.001
F				38.183		
R^2				0.160		
			Post-traumatic growth			
PTS symptoms	− 0.007	− 0.005	0.1193	− 0.056	[− 0.242; 0.229]	0.956
Intrusive rumination	0.197	0.061	0.289	0.679	[− 0.375; 0.768]	0.498
Deliberate rumination	0.922	0.309	0.229	4.032	[0.471; 1.373]	<0.001
F				8.568		
R^2				0.115		

B – unstandardised coefficents; β – standartised coefficients; CI – Confidence Interval; 95% CI also presented for unstandardised coefficients.

Mediational model

The results of the mediational analysis are presented in Figure 1 and Table 5. The direct effect of PTS symptoms on PTG was not statistically significant (β = − 0.005, SE = 0.11, $p = 0.956$). However, PTS symptoms exhibited significant positive associations with both intrusive rumination (β = 0.623, SE = 0.02, $p < 0.001$) and deliberate rumination (β = 0.40, SE = 0.03, $p < 0.001$). The path between intrusive rumination and PTG was not significant (β = 0.061, SE = 0.29, $p = 0.498$), whereas the path between deliberate rumination and PTG was significant (β = 0.309, SE = 0.23, $p < 0.001$).

Indirect effects revealed that deliberate rumination (β = 0.17, SE = 0.05, 95% CI [0.073, 0.285]) rather than intrusive rumination (β = 0.038, SE = 0.06, 95% CI [− 0.0858, 0.1637]) mediated the association between PTS symptoms and PTG. This indicates that as the number of PTS symptoms increases, women are more likely to engage in deliberate rumination, and higher engagement in deliberate rumination is associated with greater PTG. Table 5 highlights the significance of rumination in the relationship between PTS symptoms and PTG.

Discussion

The aim of this study was to investigate the association between PTS symptoms and PTG in women who underwent traumatic childbirth, examining the potential mediating role of both intrusive and deliberate rumination. Our findings indicate that women who experienced traumatic childbirth reported both PTS symptoms and PTG, with 60.4% of the participants meeting the DSM-5 criteria for PTSD (Friedman et al., 2021; Kranenburg et al., 2023; Nakić Radoš et al., 2020). Also, our results indicate that the mean of PTS symptoms in this study were higher than those reported in the validation study for the Portuguese population (Osório et al., 2022), possibly due to the more targeted focus on traumatic childbirth events in our sample.

PTS symptoms was more prevalent among women who underwent instrumental childbirth (forceps or vacuum) or caesarean section (Modarres et al., 2012). These types of deliveries, along with the use of episiotomy (Jiang et al., 2017), can evoke fear and contribute to diminished feelings of dignity during childbirth (Ferrer et al., 2016). Factors such as perineal trauma and unexpected changes in the type of childbirth were commonly identified as traumatic experiences, highlighting the impact of postnatal complications and the inability to realise one's preferred birthing experience on the development of PTS symptoms. Pop-Jordanova (2022) also emphasises the role of contextual factors, such as hospitalisation, history of psychiatric disorders, and subjective distress during labour, in contributing to PTS symptoms during the perinatal period.

Although challenging, traumatic childbirth can sometimes lead to opportunities for PTG by fostering a heightened appreciation for life and strengthening the bond between mother and child (Babu et al., 2022).

Maercker and Zoellner's two-component model (2004) suggests that PTG can be either genuine, leading to functional improvement, or illusory, driven by self-deceptive coping strategies. Some researchers argue that what seems like PTG may actually be illusory growth influenced by biases like social desirability or defensive coping, raising doubts about its authenticity (Boals, 2023; Gower et al., 2022). While most agree that PTG exists, they question the accuracy of self-reported measures, as these may not truly capture genuine growth (Boerner et al., 2020; Jayawickreme et al., 2021). This limitation applies to the PTGI (*Post-traumatic Growth Inventory*) used in our study, suggesting that some of the reported growth could be illusory rather than real.

Intrusive and deliberate rumination can predict PTG differently, with intrusive rumination generally viewed as a negative predictor of growth (Lafarge et al., 2020). Our findings align with prior research indicating no correlations between intrusive rumination and PTG (e.g. Cordova et al., 2007; Morris & Shakespeare-Finch, 2011), and that deliberate rumination can foster growth (Lindstrom et al., 2013; Triplett et al., 2012; Zhou et al., 2015). Deliberate rumination allows individuals to process and engage in cognitive work to understand their experiences (Calhoun et al., 2011). A more intentional and reflective form of rumination, where individuals actively try to understand events and their consequences, may be more effective in fostering PTG. Although some argue that intrusive rumination is necessary for processing trauma and eventually engaging in deliberate rumination (Cann et al., 2011), further research is needed to explore this relationship.

Regarding the association of rumination and PTS symptoms, our study findings demonstrate a robust correlation between post-traumatic stress symptoms and rumination (whether intrusive or deliberate). However, in examining the relationship between PTS symptoms and PTG, we only observed a weak effect size for the correlation between PTG and rumination (whether intrusive or deliberate).

The significant mediating role of deliberate rumination in fostering PTG suggests that some women may engage in reflective, purposeful thinking that supports genuine growth. However, the relatively low mean scores on the PTGI subscales, particularly in the spiritual change dimension, may reflect cultural differences in the expression of PTG, as previous research has indicated that certain aspects of growth, such as spiritual change, may be less pronounced in some populations (Tedeschi et al., 2017). The low Cronbach alpha for the spiritual change subscale in this study suggests that this dimension may not

be as internally consistent as others, possibly due to cultural differences in how spiritual change is experienced and reported in Portuguese women. Future studies should explore whether additional items are needed to better capture this aspect of growth in similar populations.

The high prevalence of intrusive rumination, which has been linked to distress and self-deceptive thinking (Boals, 2023), suggests that some women may report growth as a coping mechanism without truly resolving their trauma. So, it might be important, integrating objective measures of resilience alongside self-reported PTG scores, that may help identify which women are experiencing genuine PTG and which may be relying on illusory coping strategies.

While it is imperative for healthcare providers to take preventive measures to mitigate birth trauma whenever feasible (Leinweber et al., 2022; Watson et al., 2021), for those who undergo traumatic childbirth, healthcare providers should remain attentive to potential impacts and offer appropriate support and resources to help women process their birth experiences (Brow et al., 2022; Gökçe İsbir, et al., 2022; Stevens et al., 2021). Given the positive association between deliberate rumination and PTG, interventions promoting reflective thinking and narrative construction would be beneficial for women experiencing birth trauma, particularly those facing high levels of distress and/or at risk of complicated grief (Brandão et al., 2024; Lafarge et al., 2020; Thomson, 2017).

Study limitations

While our findings highlight the potential for PTG following traumatic childbirth, it is important to acknowledge that the PTGI used in this study does not distinguish between genuine functional growth and illusory, self-deceptive growth. Moreover, to our knowledge, no studies have specifically examined how to differentiate between real and illusory PTG in the context of traumatic childbirth. This limitation should be considered in future research, as further differentiation between these forms of growth is essential for a more precise understanding of the long-term psychological outcomes for women experiencing birth trauma.

Moreover, a limitation of our study is that we did not collect specific data on the exact time interval between the traumatic childbirth event and participation in the study. Without this information, we are unable to assess whether time since childbirth influenced the relationships between PTS symptoms, rumination, and PTG in our sample. Future studies should consider gathering this data to explore its potential impact on these associations.

Conclusions and clinical implications

The examination of the association between PTS symptoms and PTG in women following traumatic childbirth, alongside the investigation of intrusive and deliberate rumination as potential mediators, offers nuanced insights with pertinent implications for healthcare practice. Our findings revealed a high prevalence of postpartum PTS symptoms among women, with a substantial proportion meeting diagnostic criteria for PTSD. Particularly, instrumental childbirth and caesarean sections were correlated with elevated rates of PTS symptoms, highlighting the significance of informed decision-making and respectful

maternity care practices to mitigate potential traumatic birth experiences. These results underscore the necessity for healthcare professionals to prioritise women's autonomy and well-being throughout the childbirth process, striving to minimise unnecessary interventions and cultivate environments conducive to positive birth experiences.

Furthermore, our study elucidated the distinct impacts of intrusive and deliberate rumination on PTG, indicating that deliberate rumination may act as a facilitator for growth following traumatic childbirth experiences. Interventions focusing on promoting reflective thinking and narrative construction hold promise in facilitating PTG among women experiencing birth trauma, particularly those confronting distress and complicated grief. Healthcare providers, encompassing midwives, psychologists, obstetricians, nurses, and mental health specialists, play a pivotal role in delivering empathetic support and tailored interventions to assist women in processing their birth experiences and fostering resilience in the aftermath of trauma.

In summary, our study underscores the multifaceted nature of traumatic childbirth experiences and their implications for maternal mental health and well-being. By integrating insights from diverse healthcare disciplines, practitioners can implement comprehensive approaches to support women throughout the perinatal period, from informed decision-making during childbirth to postpartum care emphasising trauma-informed practices and psychological resilience-building interventions. Embracing a holistic, woman-centred approach is essential in promoting positive birth experiences and mitigating the adverse psychological sequelae of traumatic childbirth.

Acknowledgments

We would like to thank the women who made this study possible. This paper contributes to the EU COST Action 18211: DEVoTION: Perinatal Mental Health and Birth-Related Trauma: Maximising best practice and optimal outcomes (supported by COST [European Cooperation in Science and Technology]).

We thank the members of COST Action 18211 who participated in the discussion group during the meeting in Amsterdam, the Netherlands, on January 29, 2020.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

ORCID

Wilson Abreu http://orcid.org/0000-0002-0847-824X
Sónia Brandão http://orcid.org/0000-0001-8765-8240
Tânia Brandão http://orcid.org/0000-0001-7865-2445
Ana Paula Prata http://orcid.org/0000-0001-7552-9716
Rosa Silva http://orcid.org/0000-0002-3947-7098

Olga Riklikiene http://orcid.org/0000-0001-5143-4288
Gabija Jarasiunaite-Fedosejeva http://orcid.org/0000-0003-0989-6758
Ernesto S. González Mesa http://orcid.org/0000-0002-7106-092X
Gözde Gökçe İsbir http://orcid.org/0000-0003-0101-0641
Figen Inci http://orcid.org/0000-0002-9977-4297
Burku Komurcu Akik http://orcid.org/0000-0001-6051-4941
Kristiina Uriko http://orcid.org/0000-0003-0644-4473
Tatiana Governo http://orcid.org/0009-0007-5997-7915
Gill Thompson http://orcid.org/0000-0003-3392-8182

Authors' contributions

All authors were responsible for the study conception and design and were responsible for drafting the manuscript. Wilson Abreu, Sónia Brandão, Ana Paula Prata and Rosa Silva were responsible for data collection and analysis. All authors have critically reviewed and edited the manuscript for intellectual content.

References

American Psychiatric Association. (2022). Trauma- and stressor-related disorders. In *Diagnostic and statistical manual of mental disorders* (5th ed., pp. 295–328). American Psychiatric Publishing. https://doi.org/10.1176/appi.books.9780890425787

Ayers, S., Horsch, A., Garthus-Niegel, S., Nieuwenhuijze, M., Bogaerts, A., Hartmann, K., Karlsdottir, S. I., Oosterman, M., Tecirli, G., Turner, J. D., Lalor, J., & COST Action CA18211. (2024). Traumatic birth and childbirth-related post-traumatic stress disorder: International expert consensus recommendations for practice, policy, and research. *Women and Birth: Journal of the Australian College of Midwives*, *37*(2), 362–367.

Ayers, S., Wright, D. B., & Thornton, A. (2018). Development of a measure of postpartum PTSD: The city birth trauma scale. *Frontiers in Psychiatry*, *9*, 409. https://doi.org/10.3389/fpsyt.2018.00409

Babu, M. S., Chan, S. J., Ein-Dor, T., & Dekel, S. (2022). Traumatic childbirth during COVID-19 triggers maternal psychological growth and in turn better mother-infant bonding. *Journal of Affective Disorders*, *313*, 163–166. https://doi.org/10.1016/j.jad.2022.06.076

Berman, Z., Thiel, F., Dishy, G. A., Chan, S. J., & Dekel, S. (2021). Maternal psychological growth following childbirth. *Archives of Women's Mental Health*, *24*(3), 313–320. https://doi.org/10.1007/s00737-020-01053-9

Boals, A. (2023). Illusory posttraumatic growth is common, but genuine posttraumatic growth is rare: A critical review and suggestions for a path forward. *Clinical Psychology Review*, *103*, 102301. https://doi.org/10.1016/j.cpr.2023.102301

Boerner, M., Joseph, S., & Murphy, D. (2020). A theory on reports of constructive (real) and illusory posttraumatic growth. *Journal of Humanistic Psychology*, *60*(3), 384–399. https://doi.org/10.1177/0022167817719597

Brandão, T., Brandão, S., Prata, A. P., Silva, R., Abreu, W., Riklikiene, O., Jarasiunaite-Fedosejeva, G., González-Mesa, E., İsbir, G. G., Inci, F., Akik, B. K., Uriko, K., & Thomson, G. (2024). Posttraumatic growth in women after a childbirth experience: The influence of individual characteristics and intrusive and deliberate rumination. *Psychological Trauma: Theory, Research, Practice, & Policy*. Advance online publication. https://doi.org/10.1037/tra0001665

Brandão, T., Brites, R., Nunes, O., Pires, M., & Hipólito, J. (2020). Anxiety and depressive symptoms during pregnancy, perceived control and posttraumatic stress symptoms after childbirth: A longitudinal mediation analysis. *Journal of Health Psychology*, *25*(13–14), 2085–2095. https://doi.org/10.1177/1359105318787018

Brown, A., Nielsen, J. D. J., Russo, K., Ayers, S., & Webb, R. (2022). The journey towards resilience following a traumatic birth: A grounded theory. *Midwifery*, *104*. https://doi.org/10.1016/j.midw.2021.103204

Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2011). The posttraumatic growth model: Sociocultural considerations. In T. Weiss & R. Berger (Eds.), *Posttraumatic growth and culturally competent practice* (pp. 1–14). Wiley & Sons.

Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: The event related rumination inventory. *Anxiety, Stress & Coping*, *24*(2), 137–156. https://doi.org/10.1080/10615806.2010.529901

Caparros-Gonzalez, R. A., Romero-Gonzalez, B., Peralta-Ramirez, M. I., Ayers, S., Galán-Paredes, A., & Caracuel-Romero, A. (2021). Assessment of posttraumatic stress disorder among women after childbirth using the city birth trauma scale in Spain. *Psychological Trauma: Theory, Research, Practice, & Policy*, *13*(5), 545–554. https://doi.org/10.1037/tra0001007

Cordova, M. J., Giese-Davis, J., Golant, M., Kronenwetter, C., Chang, V., & Spiegel, D. (2007). Breast cancer as trauma: Posttraumatic stress and posttraumatic growth. *Journal of Clinical Psychology in Medical Settings*, *14*(4), 308–319. https://doi.org/10.1007/s10880-007-9083-6

Dekel, S., Ein-Dor, T., Dishy, G. A., & Mayopoulos, P. A. (2020). Beyond postpartum depression: Posttraumatic stress-depressive response following childbirth. *Archives of Women's Mental Health*, *23*, 557–564. https://doi.org/10.1007/s00737-019-01006-x

Dell'osso, L., Carpita, B., Nardi, B., Bonelli, C., Calvaruso, M., & Cremone, I. M. (2023). Biological correlates of post-traumatic growth (PTG): A literature review. *Brain Sciences*, *13*(2), 305. https://doi.org/10.3390/brainsci13020305

Dell'osso, L., Lorenzi, P., Nardi, B., Carmassi, C., & Carpita, B. (2022). Post traumatic growth (PTG) in the frame of traumatic experiences. *Clinical Neuropsychiatry*, *19*(6), 390. https://doi.org/10.36131/cnfioritieditore20220606

Dickinson, S. (2021). Post-traumatic growth in the twenty-first century: How current trends may threaten our ability to grow after trauma. *The Journal of Positive Psychology*, *16*(4), 503–511. https://doi.org/10.1080/17439760.2020.1752782

Ertan, D., Hingray, C., Burlacu, E., Sterlé, A., & El-Hage, W. (2021). Post-traumatic stress disorder following childbirth. *BMC Psychiatry*, *21*(1), 1–9. https://doi.org/10.1186/s12888-021-03158-6

Ferrer, M. B. C., Jordana, M. C., Meseguer, C. B., García, C. C., & Roche, M. E. M. (2016). Comparative study analysing women's childbirth satisfaction and obstetric outcomes across two different models of maternity care. *BMJ Open*, *6*(8), e011362. https://doi.org/10.1136/bmjopen-2016-011362

Friedman, M. J., Bovin, M. J., & Weathers, F. W. (2021). DSM-5 criteria for PTSD. In M. J. Friedman, P. P. Schnurr, & T. M. Keane (Eds.), *Handbook of PTSD: Science and practice* (3rd ed, pp. 19–37). The Guilford Press and Public Health, 19(14). https://doi.org/10.3390/ijerph19148830

Garthus-Niegel, S., von Soest, T., Knoph, C., Simonsen, T. B., Torgersen, L., & Eberhard-Gran, M. (2014). The influence of women's preferences and actual mode of delivery on post-traumatic stress symptoms following childbirth: A population-based, longitudinal study. *BMC Pregnancy and Childbirth*, *14*(1), 1–10. https://doi.org/10.1186/1471-2393-14-191

Gökçe İsbir, G., İnci, F., Kömürcü Akik, B., Abreu, W., & Thomson, G. (2023). Birth-related PTSD symptoms and related factors following preterm childbirth in Turkey. *Current Psychology*, *42*(31), 27656–27667. https://doi.org/10.1007/s12144-022-03841-z

Gower, T., Pham, J., Jouriles, E. N., Rosenfield, D., & Bowen, H. J. (2022). Cognitive biases in perceptions of posttraumatic growth: A systematic review and meta-analysis. *Clinical Psychology Review*, *94*, 102159. https://doi.org/10.1016/j.cpr.2022.102159

Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.

Henson, C., Truchot, D., & Canevello, A. (2021). What promotes post traumatic growth? A systematic review. *European Journal of Trauma & Dissociation*, *5*(4), 100195. https://doi.org/10.1016/j.ejtd.2020.100195

Hernández-Martínez, A., Rodríguez-Almagro, J., Molina-Alarcón, M., Infante-Torres, N., Rubio-Álvarez, A., & Martínez-Galiano, J. M. (2020). Perinatal factors related to post-traumatic stress

disorder symptoms 1-5 years following birth. *Women & Birth*, *33*(2), e129–e135. https://doi.org/10.1016/j.wombi.2019.03.008

Jayawickreme, E., Infurna, F. J., Alajak, K., Blackie, L. E., Chopik, W. J., Chung, J. M., Dorfman, A., Fleeson, W., Forgeard, M. J. C., Frazier, P., Furr, R. M., Grossmann, I., Heller, A. S., Laceulle, O. M., Lucas, R. E., Luhmann, M., Luong, G., Meijer, L., McLean, K. C., & White, R. M. B.. . . Zonneveld, R. (2021). Post-traumatic growth as positive personality change: Challenges, opportunities, and recommendations. *Journal of Personality*, *89*(1), 145–165. https://doi.org/10.1111/jopy.12591

Jiang, H., Qian, X., Carroli, G., & Garner, P. (2017). Selective versus routine use of episiotomy for vaginal birth. *Cochrane Database of Systematic Reviews*, *2017*, CD000081. 2). https://doi.org/10.1002/14651858.CD000081.pub3

Ketley, R., Darwin, Z., Masterson, C., & McGowan, L. (2024). Women's experience of post-traumatic growth following a traumatic birth: An interpretive phenomenological analysis. *Journal of Reproductive and Infant Psychology*, *42*(1), 126–137. https://doi.org/10.1080/02646838.2022.2070608

Khoramroudi, R. (2018). The prevalence of posttraumatic stress disorder during pregnancy and postpartum period. *Journal of Family Medicine and Primary Care*, *7*(1), 220–223.

Kranenburg, L., Lambregtse van den Berg, M., & Stramrood, C. (2023). Traumatic childbirth experience and childbirth-related post-traumatic stress disorder (PTSD): A contemporary overview. *International Journal of Environmental Research and Public Health*, *20*(4), 2775. https://doi.org/10.3390/ijerph20042775

Lafarge, C., Usher, L., Mitchell, K., & Fox, P. (2020). The role of rumination in adjusting to termination of pregnancy for fetal abnormality: Rumination as a predictor and mediator of posttraumatic growth. *Psychological Trauma*, *12*(1), 101–109. https://doi.org/10.1037/tra0000440

Leinweber, J., Fontein-Kuipers, Y., Thomson, G., Karlsdottir, S. I., Nilsson, C., Ekström-Bergström, A., Olza, I., Hadjigeorgiou, E., & Stramrood, C. (2022). Developing a woman-centered, inclusive definition of traumatic childbirth experiences: A discussion paper. *Birth (Berkeley, Calif)*, *49*(4), 687–696. https://doi.org/10.1111/birt.12634

Lindstrom, C. M., Cann, A., Calhoun, L. G., & Tedeschi, R. G. (2013). The relationship of core belief challenge, rumination, disclosure, and sociocultural elements to posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, & Policy*, *5*(1), 50–55. https://doi.org/10.1037/a0022030

Maercker, A., & Zoellner, T. (2004). The janus face of self-perceived growth: Toward a two-component model of posttraumatic growth. *Psychological Inquiry*, *15*(1), 41–48. https://doi.org/10.1207/s15327965pli1501_01

Malhotra, M., & Chebiyan, S. (2016). Posttraumatic growth: Positive changes following adversity-an overview. *International Journal of Psychology and Behavioral Sciences*, *6*(3), 109–118. https://doi.org/10.5923/j.ijpbs.20160603.03

Martinez-Vázquez, S., Rodríguez-Almagro, J., Hernández-Martínez, A., & Martínez-Galiano, J. M. (2021). Factors associated with postpartum post-traumatic stress disorder (PTSD) following obstetric violence: A cross-sectional study. *Journal of Personalized Medicine*, *11*(5), 338. https://doi.org/10.3390/jpm11050338

McKelvin, G., Thomson, G., & Downe, S. (2021). The childbirth experience: A systematic review of predictors and outcomes. *Women & Birth*, *34*(5), 407–416. https://doi.org/10.1016/j.wombi.2020.09.021

Miethe, S., Wigger, J., Wartemann, A., Fuchs, F. O., & Trautmann, S. (2023). Posttraumatic stress symptoms and its association with rumination, thought suppression and experiential avoidance: A systematic review and meta-analysis. *Journal of Psychopathology and Behavioral Assessment*, *45*(2), 480–495. https://doi.org/10.1007/s10862-023-10022-2

Modarres, M., Afrasiabi, S., Rahnama, P., & Montazeri, A. (2012). Prevalence and risk factors of childbirth-related post-traumatic stress symptoms. *BMC Pregnancy and Childbirth*, *12*(1), 1–6. https://doi.org/10.1186/1471-2393-12-88

Morris, B. A., & Shakespeare-Finch, J. (2011). Rumination, post-traumatic growth, and distress: Structural equation modelling with cancer survivors. *Psycho-Oncology*, *20*(11), 1176–1183. https://doi.org/10.1002/pon.1827

Moulds, M. L., Bisby, M. A., Wild, J., & Bryant, R. A. (2020). Rumination in posttraumatic stress disorder: A systematic review. *Clinical Psychology Review*, *82*, 101910. https://doi.org/10.1016/j.cpr.2020.101910

Nakić Radoš, S., Matijaš, M., Kuhar, L., Anđelinović, M., & Ayers, S. (2020). Measuring and conceptualizing PTSD following childbirth: Validation of the city birth trauma scale. *Psychological Trauma: Theory, Research, Practice, & Policy*, *12*(2), 147. https://doi.org/10.1037/tra0000501

Osório, F. L., Rossini Darwin, A. C., Bombonetti, E. A., & Ayers, S. (2022). Posttraumatic stress following childbirth: Psychometric properties of the Brazilian version of the city birth trauma scale. *Journal of Psychosomatic Obstetrics & Gynecology*, *43*(3), 374–383. https://doi.org/10.1080/0167482X.2021.1977278

Pop-Jordanova, N. (2022). Childbirth-Related Psychological Trauma. Prilozi (Makedonska Akademija na Naukite i Umetnostite. *Oddelenie za Medicinski Nauki*, *43*(1), 17–27. https://doi.org/10.2478/prilozi-2022-0002

Ramos, C., Figueiras, L., Lopes, M., Leal, I., & Tedeschi, R. (2015). Inventário de ruminação relacionada com o acontecimento: Qualidades psicométricas na população portuguesa. *Psícologia, Saúde e Doenças*, *16*(3), 299–310. https://doi.org/10.15309/15psd160303

Sawyer, A., Ayers, S., Young, D., Bradley, R., & Smith, H. (2012). Posttraumatic growth after childbirth: A prospective study. *Psychology & Health*, *27*(3), 362–377. https://doi.org/10.1080/08870446.2011.578745

Shorey, S., & Wong, P. Z. E. (2022). Traumatic childbirth experiences of new parents: A meta-synthesis. *Trauma, Violence, & Abuse*, *23*(3), 748–763. https://doi.org/10.1177/1524838020977161

Silva, S., Moreira, H., Pinto, S., & Canavarro, M. C. (2009). Cancro da mama e desenvolvimento pessoal e relacional: Estudo das características psicométricas do Inventário de Desenvolvimento Pós-Traumático (Posttraumatic Growth Inventory) numa amostra de mulheres da população portuguesa. *Revista Iberoamericana de Diagnóstico e Avaliação Psicológica*, *28*(2), 105–133.

Stevens, N., Miller, M., Puetz, A., Padin, A., Adams, N., & Meyer, D. (2021). Psychological intervention and treatment for posttraumatic stress disorder during pregnancy: A systematic review and call to action. *Journal of Traumatic Stress*, *34*(3), 575–585. https://doi.org/10.1002/jts.22641

Taku, K., Cann, A., Tedeschi, R. G., & Calhoun, L. G. (2009). Intrusive versus deliberate rumination in posttraumatic growth across US and Japanese samples. *Anxiety, Stress & Coping*, *22*(2), 129–136. https://doi.org/10.1080/10615800802317841

Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, *9*(3), 455–471. https://doi.org/10.1002/jts.2490090305

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, *15*(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01

Tedeschi, R. G., Cann, A., Taku, K., Senol-Durak, E., & Calhoun, L. G. (2017). The posttraumatic growth inventory: A revision integrating existential and spiritual change. *Journal of Traumatic Stress*, *30*(1), 11–18. https://doi.org/10.1002/jts.22155

Tedeschi, R., Shakespeare-Finch, J., Taku, K., & Calhoun, L. (2018). *Posttraumatic growth: Theory, research, and applications*. Routledge. https://doi.org/10.4324/9781315527451

Thomson, G. (2017). Growth and renewal through traumatic birth. In *Spirituality and childbirth* (pp. 142–158). Routledge. https://doi.org/10.4324/9781315389646

Tomsis, Y., Gelkopf, M., Yerushalmi, H., & Zipori, Y. (2018). Different coping strategies influence the development of PTSD among first-time mothers. *The Journal of Maternal-Fetal & Neonatal Medicine*, *31*(10), 1304–1310. https://doi.org/10.1080/14767058.2017.1315658

Triplett, K. N., Tedeschi, R. G., Cann, A., Calhoun, L. G., & Reeve, C. L. (2012). Posttraumatic growth, meaning in life, and life satisfaction in response to trauma. *Psychological Trauma: Theory, Research, Practice, & Policy*, *4*(4), 400–410. https://doi.org/10.1037/a0024204

Watson, K., White, C., Hall, H., & Hewitt, A. (2021). Women's experiences of birth trauma: A scoping review. *Women & Birth*, *34*(5), 417–424. https://doi.org/10.1016/j.wombi.2020.09.016

World Health Organization. (2018). *Intrapartum care for a positive childbirth experience*.

Wortman, C. B. (2004). Posttraumatic growth: Progress and problems. *Psychological Inquiry*, *15*(1), 81–90.

Zhou, X., Wu, X., Fu, F., & An, Y. (2015). Core belief challenge and rumination as predictors of PTSD and PTG among adolescent survivors of the Wenchuan earthquake. *Psychological Trauma*, *7*(4), 391–397. https://doi.org/10.1037/tra0000031

Zlotnick, C., & Manor-Lavon, I. (2023). Resilience, optimism and posttraumatic growth in first-time mothers. *Research in Nursing & Health*, *46*(6), 576–590. https://doi.org/10.1002/nur.22338

Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology-A critical review and introduction of a two-component model. *Clinical Psychology Review*, *26*(5), 626–653. https://doi.org/10.1016/j.cpr.2006.01.008