Post-traumatic Growth and its Associations with Perceived Stress and Core Beliefs in Women Following Traumatic Childbirth during the COVID-19 Pandemic in Portugal

Abstract

Background

The COVID-19 pandemic added new challenges and stressors to the childbirth period, potentially increasing the risk of traumatic childbirth experiences. There is little known about Post-traumatic Growth (PTG) in a childbearing population. This study describes PTG in women after traumatic childbirth during the COVID-19 pandemic and its association with sociodemographic, birth related characteristics, traumatic childbirth events, perceived stress and core beliefs, as well as exploring what factors predict PTG.

Methods

We conducted a cross-sectional study with 202 women who self-identified as having experienced traumatic childbirth. Measures included sociodemographic and birth-related characteristics, traumatic childbirth events, self-reported stress during childbirth, the PTG Inventory, and the Core Beliefs Inventory (CBI).

Results

Perceived stress at the time of birth was very high in 70% of the respondents. CBI showed moderate disruption of core beliefs; 41.6% of mothers indicated substantial PTG. Education and type of birth were related to perceived stress levels. Higher disruption of core beliefs was observed in individuals who experienced perineal trauma and a lack of partners' presence during childbirth, and higher disruption of core beliefs was positively associated with PTG. Predictive models showed that perceived stress had a minimal effect, while the disruption of core beliefs showed a significant positive association with PTG.

Conclusion

Traumatic childbirth experiences during the COVID-19 pandemic were positively related to PTG. Health professionals should create an environment where women can explore their feelings and emotions. Changes in current practices are also necessary, as caesarean sections have been shown to be highly associated with high levels of perceived stress.

KEYWORDS

Post-t raumatic growth, childbirth trauma, COVID-19, perceived stress, core beliefs, and sociodemographic factors.

1 INTRODUCTION

Childbirth is a transformative and emotionally charged experience for women, often characterized by a mix of joy and vulnerability. [1] While it can be a positive event, it can also lead to trauma and negative psychological consequences. [1] The outbreak of the COVID-19 pandemic introduced new challenges and stressors to the childbirth period, which may have increased the risk of traumatic childbirth experiences. [2,3]

A traumatic birth refers to any childbirth experience that the birthing woman perceives as traumatic, encompassing a range of experiences and negative psychological responses to childbirth. Traumatic childbirth can be associated with unfulfilled expectations during childbirth, childbirth complications, stillbirth or death of a baby after birth, obstetric violence, or whatever else the woman perceives as traumatic . The definition is subjective and varies widely from individual to individual, reflecting the diversity of experiences and the different emotional and physical responses to these events. [4-7] When childbirth is experienced negatively, this can have a profound impact on the psychological well-being of the mother, the father, and the child. [2] It is known that approximately 5% of mothers develop birth-related post-traumatic stress disorder, and 12% experience birth-related post-traumatic stress symptoms. [8] A traumatic birth can have a negative impact on physical and emotional health, breastfeeding, child development, mother-child attachment, and the quality of the couple's relationship. [3] However, despite these negative impacts, there are women who can experience growth through self-perceived positive changes after a traumatic childbirth experience. [5,7,9]

The growth perceived by individuals after a traumatic event is defined as P ost-traumatic G rowth (PTG). [10] For PTG to occur, individuals must have experienced a traumatic or highly stressful event. [11] PTG is the positive psychological change experienced as a result of struggling with highly challenging life circumstances. [12,13] This process is highly adaptive as it involves the healthy integration of a traumatic event which can be protective for the mental health of the individual. PTG has been identified in various groups, including women who have experienced childbirth as a traumatic experience. [5,9] However, who experiences PTG can depend on factors

that influence an individual's psychological response to stress, such as personality, coping styles, severity, duration of the event, and so on . [3,11,14,15]

PTG is intricately connected to core beliefs. Core beliefs are deeply held convictions that shape the way individuals view themselves, others, and the world around them, influencing their thoughts, feelings, and behaviors. [14,16] Core beliefs play a significant role in shaping women's experiences during childbirth, particularly in the context of traumatic events. Negative or maladaptive core beliefs can significantly impact women's experiences during childbirth and in traumatic situations. Beliefs of helplessness, vulnerability, or a perception of being permanently damaged may hinder women's ability to cope effectively and exacerbate distress during labor. [14,17-19]

Another concept to highlight is perceived stress, which refers to the sensation or assessment that an individual makes about how stressful situations or circumstances in their life are during a certain period. [20] Therefore, perceived stress during childbirth refers to the subjective self-appraisal of the level of stress or psychological pressure experienced by women during the birthing process. [17] The interpretation and meaning assigned to perceived stress during childbirth can play a crucial role in the development of PTG. Women who can reframe their perceived stress as an opportunity for personal growth may be more likely to experience positive changes following the traumatic birthing experience. This cognitive appraisal process can facilitate the exploration of new possibilities, foster resilience, and contribute to the development of PTG. [17,21]

Perceived stress is particularly important to consider during the COVID-19 pandemic, where additional stressors such as fear of infection, limited support, and uncertainty regarding safety protocols were prevalent. [2,22,23] In Portugal, like in other countries, [23] COVID-19 contributed to changes in clinical practices. For example, initially, all pregnant women were considered infected until they tested negative for COVID-19. The guidelines included prohibiting companions during childbirth and postpartum, wearing masks, and restricting visitors. Additionally, for women testing positive for COVID-19, skin-to-skin contact and breastfeeding were discouraged. [24,25] It is possible that any or all of these issues increased the likelihood that women would experience childbirth as traumatic. The lack of support from a significant other during childbirth, mother-infant separation, discouraging skin-to-skin contact, and breastfeeding are negative and significant experiences that are contrary to best practice and international recommendations. [3,26-28]

This study describes PTG in women in the context of a traumatic childbirth during the COVID-19 pandemic, and its association with sociodemographic, birth related characteristics, traumatic childbirth events, perceived stress, and core beliefs, as well as exploring what factors predict PTG.

2 METHODS

The study employed a cross-sectional survey design. Data collection was conducted in the northern region of Portugal between April 2020 and December 2021.

2.1 Procedure

This study adhered to the cohort study reporting guidelines to strengthen the reporting of observational studies in epidemiology (STROBE). [16] During the data collection period, Portugal, as elsewhere, faced dramatic situations with known restrictions due to COVID-19. Considering this situation and the risks associated with face-to-face data collection in hospital and community environments during the pandemic, the survey was conducted online (e-survey). A rigorous pilot study was conducted that involved pre-testing the survey to identify any problems with the wording or interpretation of the questions before the e-survey launch. Only minor adjustments to the linguistic context were needed, and that were made.

This study is a sub-study conducted within the larger project "Perinatal Mental Health and Birth-Related Trauma," which falls under the framework of COST Action CA18211. The overall objective of COST Action 18211 is to establish a pan-European multidisciplinary network of birth trauma researchers.

2.2 Participants and data collection

To reach the participants, an e-survey was distributed via email through several contacts and via various social networks. Women who reported having experienced a traumatic event during childbirth and had a newborn of at least one month of age were included. Women whose newborns had died were excluded from the study. Women were asked to indicate their consent to participate by reading consent statements and then checking a box. The study began by asking participants if they had experienced a distressing or traumatic event during childbirth. Those who answered affirmatively were eligible to continue with the study, while those who responded negatively were redirected to a 'thank you' page and did not proceed further. The study was approved by the Research Ethics Committee with the number 2019 530.

2.3 Measures

Participants were asked to complete a form to collect sociodemographic, birth- related characteristics (parity, type of birth, and pregnancy planning), and traumatic childbirth events. Questions that related to traumatic childbirth events were measured using (1) a question about infant conditions (i.e., infant health problems, including prematurity), (2) birth problems (i.e., perineal trauma, change in the type of birth, and use of forceps) and (3) loss of control during childbirth (i.e., lack of pain control during childbirth, prohibiting partners' presence, and parturient unexpected health problems). These questions were based on insights reported in reviews of the evidence on factors that impact on traumatic birth. [19,29]

Perceived stress was assessed through a question about the level of stress felt at the birth moment: "What level of stress did you feel at the birth moment?"; the level of stress was evaluated with a Likert scale ranging from 1 to 5. A score of 1 indicated a "very low level of stress", while a score of 5 indicated a "very high level of stress".

The PTG Inventory (PTGI) covers five dimensions: 'Relationships with Others'; 'New Possibilities'; 'Personal Strength'; 'Changes in Spirituality', and 'Appreciation of Life'. 4,23. The Portuguese version of the PTGI was used. [10,30] The PTGI consists of a self-report questionnaire aimed at assessing the perception of positive changes after a traumatic event, with 21 items scored on a Likert scale ranging from 0 ("I did not experience this change") to 5 ("I experienced it completely"). The final score ranges from 0 to 105 points, with a higher score representing a heightened perception of positive changes after the event (Tedeschi & Calhoun, 1996). In a validation study, the internal consistency of the total PTGI was 0.90 and the test–retest reliability for the total PTGI was acceptable at $r = 0.71$.[10,30] In the Portuguese validation, Cronbach's alpha was good ($\alpha = 0.72$).[30] In the present study, it was 0.96, 0.92 for the Relationships with Others subscale, 0.83 for the New Possibilities subscale, 0.82 for the Personal Strength subscale, 0.54 for the Changes in Spirituality subscale, and 0.82 for the Appreciation of Life subscale.

The Core Beliefs Inventory (CBI) is a scale that assesses the degree to which an individual's assumptive world has been disrupted by examining their core beliefs about their personal strengths and weaknesses, human nature, relationships, the meaning of life, and religious and spiritual matters. The Portuguese version was used for this study. [14,31] It consists of 9 items, each rated on a 6-point Likert-type scale ranging from 0 (not at all) to 5 (a very great degree). The total score ranges from 0 to 45, with higher scores indicating a greater disruption of core

beliefs. [14] The CBI has demonstrated good internal consistency (α = 0.82 – 0.87), acceptable test-retest reliability, and satisfactory construct validity. [14] In the Portuguese validation, Cronbach's alpha (α = 0.85) was found to be good; [31] and in the present study, it demonstrated good reliability (α = 0.93).

2.4 Statistical Data Analysis

The data were analysed using SPSS version 28. Pearson correlations were used to assess the strength and direction of the associations between perceived stress, core beliefs, and dimensions of PTG. Differences between groups were calculated using independent samples t-tests and analysis of variance (ANOVA). Perceived stress levels, core beliefs, and PTG in relation to sociodemographic, birth- related, and trauma-related variables were examined. Post-hoc comparisons were conducted to identify significant differences. To assess the association between continuous variables and identify suitable variables for inclusion in the regression models, correlations were employed as a preliminary analysis method (point-biserial correlations were used for dichotomous variables). Furthermore, a linear regression analysis was performed to develop a predictive model for PTGI scores. The significance level adopted was $p < 0.05$.

3 RESULTS

The distribution of sociodemographic, birth- related characteristics, and traumatic childbirth events in the sample is presented in Table 1.

Table 1. *The distribution of sociodemographic, birth- related characteristics and traumatic childbirth events in a sample (N = 202)*

		n (%)	x̄±SD
Sociodemographic			
Age	18-46		33.68 ± 4.70
Marital status	Single	10 (5)	
	Married/non marital partnership	188 (93)	
	Divorced	4 (2)	
Education	Complete basic school	7 (3.5)	
	Complete secondary school	33 (16.3)	

	Bachelor's degree or more	162 (80.2)
Current professional situation	Employed	170 (84.2)
	Unemployed	32 (15.8)
Family annual income	Less than 10.000 euros	14 (6.9)
	10.000 to 20.000 euros	87 (43.1)
	20.001 to 37.500 euros	70 (34.7)
	37.501 to 70.000 euros	22 (10.9)
	70.001 euros or more	9 (4.5)
Birth related characteristics		
Parity	Primiparous	134 (66.3)
	Multiparous	68 (33.7)
Pregnancy planning	Planned	155 (76.7)
	Not planned	47 (23.3)
Type of birth	Vaginal	63 (31.2)
	Vaginal with forceps or vacuum	63 (31.2)
	Caesarean	76 (37.6)
Traumatic childbirth events		
Related to child conditions	Health problems (including prematurity)	28 (13.9)
Related to birth problems	Perineal trauma	56 (27.7)
	Change in type of birth	46 (22.8)
	Use of forceps	27 (13.4)
Related to birth experience	Lack of pain control during labor	23 (11.4)
	Lack of partners' presence	18 (8.8)
	Parturient unexpected health problem	4 (2.0)
Perceived Stress' level	Very low level	13 (6.4)
[range 1-5]	Low level	13 (6.4)
	Moderate level	6 (3.0)
	High level	29 (14.4)
	Very high level	141 (69.8)

Perceived stress level, at the moment of birth, was very high (see, Table 1) for 69.8% (n= 141) of the sample [Mdn = 5; range 1(very low) to 5 (very high)]. The average score of the CBI was 24.9 (SD= 9.93, range 9-45); mean scores were 2.77 (SD= 1.10, range 1-5) indicating a small to moderate disruption of core beliefs. The average PTGI score was 49.21 (SD = 25.72, range 13-105); 37.6% (n = 76) of women presented some degree of growth (25 ≤ PTGI ≤ 50), and 41.6% (n = 84) indicated more substantial growth (PTGI > 50). See Table 2.

Table 2. *The distribution of PTG in a sample (N = 202)*

	Range	x̄	SD
Relating with Others#	0 - 30	13.49	8.92
New Possibilities#	3 - 25	11.99	6.00
Personal Strength#	1 - 20	10.27	5.21
Spiritual Change#	1 - 10	4.18	2.55
Appreciation of Life#	3 - 15	8.64	3.76

PTGI Subscales

Perceived stress differences related to sociodemographic, birth- related variables, and traumatic childbirth events

The results showed that perceived stress, at the moment of birth, did not differ between women having different employment status (t (200) = 0.49, p = 0.622) or marital status (F(1,200) = 0.52, p = 0.470, μ2 = 0.00). However, there were differences in perceived stress based on education (F(2,199) = 3.08, p < 0.05, μ2 = 0.03). Post-hoc analyses revealed that individuals who had completed secondary school (M = 4.57, SD = 0.54) reported higher stress levels compared to those with a bachelor's or higher degree (M = 4.43, SD = 1.10) (p < 0.05).

Perceived stress did not differ between primiparous and multiparous women (*t*(200) = 1.68, p = 0.094) nor was it related to planned or unplanned pregnancy (*t*(200) = 0.73, p = 0.466). The level of perceived stress differed in type of birth (F(2,199) = 6.33, p < 0.01, μ2 = 0.06). Post-hoc comparisons indicated significant differences between caesarean section and vaginal births (p < 0.05), as well as between caesarean and vaginal forceps/vacuum births (p < 0.01). Women who underwent a caesarean section reported higher levels of perceived stress (M = 4.78, SD =

0.61) compared to those who had a vaginal birth (M = 3.96, SD = 1.36) or a vaginal forceps/vacuum birth (M = 4.20, SD = 1.34).

Variables related to traumatic childbirth events (three categories) did not show significant differences in perceived stress ($F(2, 199) = 1.17$, $p = 0.312$, $\mu 2 = 0.01$).

Core beliefs according to sociodemographic, birth- related variables, and traumatic childbirth events

There were no significant differences in the disruption of core beliefs based on employment status ($F(1.200) = 0.37$, $p = 0.544$, $\mu 2 = 0.00$), marital status ($F(1.200) = 0.07$, $p = 0.793$, $\mu 2 = 0.00$), or education level ($F(2.199) = 0.16$, $p = 0.852$, $\mu 2 = 0.00$). Regarding birth related characteristics, no significant differences were found based on parity ($F(1.200) = 1.71$, $p = 0.193$, $\mu 2 = 0.01$) or planned pregnancy ($F(1.200) = 2.62$, $p = 0.107$, $\mu 2 = 0.01$).

Additionally, type of birth was not associated with core belief scores ($F(2.199) = 0.35$, $p = 0.702$, $\mu 2 = 0.00$). However, when examining traumatic childbirth events, significant positive relationships were found between core beliefs and specific traumatic childbirth events ($F(6,195) = 2.46$, $p < 0.05$, $\mu 2 = 0.07$). Further analysis through post-hoc tests indicated that individuals who experienced perineal trauma (M = 2.47, SD = 1.05) and those who faced restrictions regarding their lack of partners' presence during childbirth (M = 3.37, SD = 1.34) reported higher changes or disruptions in core beliefs ($p = 0.053$).

Post-traumatic growth according to sociodemographic, birth- related variables, and traumatic childbirth events

No significant differences in PTGI scores were observed based on employment status ($F(1.200) = 0.07$, $p = 0.795$, $\mu 2 = 0.00$), marital status ($F(1.200) = 0.92$, $p = 0.339$, $\mu 2 = 0.01$), parity ($F(1.200) = 1.49$, $p = 0.224$, $\mu 2 = 0.01$), planned pregnancy ($F(1.200) = 1.13$, $p = 0.289$, $\mu 2 = 0.01$), or type of birth ($F(2.199) = 2.41$, $p = 0.092$, $\mu 2 = 0.02$). However, the type of birth was significantly associated with three subscales of the PTGI. Age presented a negative association with PTGI (see Table 3). There were differences in PTGI scores based on education ($F(2.199) = 3.30$, $p < 0.05$, $\mu 2 = 0.03$), but post-hoc tests did not reveal any significant differences in PTGI scores among different education levels. Regarding traumatic childbirth events no

significant differences in PTGI scores were found among any of the categories assessed ($F(6.195) = 1.16$, $p = 0.329$, $\mu 2 = 0.03$).

Associations between perceived stress, core beliefs, and PTG

Perceived stress, at the birth moment, was significantly associated with the PTGI subscales of 'Spiritual Change' and 'Appreciation of Life. Core beliefs were moderately related to PTGI and its subscales.

Table 3. *Pearson/point-biserial correlations among study variables*

	1	2	3	4	5	6	7	8	9
1. Perceived stress	-					,			
2. Core beliefs	0.115	-							
3. Relating with others #	0.035	0.430***	-						
4. New possibilities #	0.017	0.420***	0.858***	-					
5. Personal Strength #	0.014	0.434***	0.960***	0.821***	-				
6. Spiritual Change #	0.306***	0.419***	0.562***	0.615***	0.560***	-			
7. Appreciation of life #	0.650***	0.221**	0.175*	0.194**	0.187**	0.585***	-		
8. PTGI – total score	0.043	0.485***	0.929***	0.927***	0.916***	0.677***	0.224***	-	
9. Age	-0.061	-0.092	-0.115	-0.108	-0.194**	-0.089	-0.097	-0.161*	-
10. Type of birth	-0.236***	0.023	0.163**	0.114	0.159*	0.011	-0.148*	0.132	0.011

Note: *p< 0.05; **p< 0.01; ***p< 0.001; # PTGI Subscales; PTGI – Posttraumatic Growth Inventory

Predictors of post-traumatic growth

Hierarchical linear regression analyses were conducted using various predictor variables. Two models were examined in the analysis.

In Model 1, the relationship between PTGI scores and only the type of birth (vaginal vs. Caesarean) and age was explored. The results revealed a weak positive association ($R = 0.209$) between these variables; Only 4.4% of the variability in PTGI scores could be explained by these predictors ($R^2 = 0.044$).

Model 2 extended the analysis by including additional predictors of type of birth (vaginal vs. caesarean), age, core beliefs, and perceived stress. This model showed a stronger relationship between the predictors and PTGI scores ($R= 0.514$). The proportion of variability explained by the predictors increased to 26.4% ($R^2 = 0.264$).

In Models 1 and 2, the regression analysis indicated that the model was statistically significant ($F = 4.549$, $p = 0.012$), ($F = 17.679$, $p < 0.001$).

Table 4. *Predictors of post-traumatic growth*

Model	B	Std. Error	Beta	t	R	R^2	Adjusted R^2	Std. Error of the Estimate	F
1									
Age	-0.888	0.380	-0.162	-2.338*					
Type of birth #	7.514	3.892	0.134	1.931					
					0.209[a]	0.044	0.034	25.27	4.55
2									
Age	-0.648	0.336	-0.118	-1.925					
Type of birth #	7.038	3.536	0.125	1.990*					
Perceived stress	0.241	1.355	0.011	0.178					
Core beliefs	10.962	1.442	0.470	7.604**					
					0.514[b]	0.264	0.249	22.28	17.68

Note: # (vaginal vs. caesarean); *p< 0.05

a. Predictors: Age; Type of birth

b. Predictors: Age; Type of birth; mean CBI; Perceived stress

4 DISCUSSIONS

The results revealed that many women (42%) experienced substantial growth following their traumatic childbirth. This finding is similar to other studies carried out in the context of childbirth trauma [32] and childbirth-related PTG in women during the COVID-19 pandemic. [33] Regarding the PTGI subscales, 'Relation with Others' was the dimension with the highest score, and 'Spiritual Change' was the lowest. PTG is not a universal outcome, as different individuals may respond to trauma in diverse ways. [21,32,34,35] Although other studies have reported PTG after childbirth, this growth seems more likely to occur at an interpersonal level than at a spiritual level. [5,7,32,35,36] We found that PTG appears to have a negative

association with age, highlighting that the younger a woman is, the greater her growth. The "Personal Strength" subscale of the PTGI presented, in this study, a very strong association with PTGI in women after a traumatic birth, indicating that a traumatic birth can lead to a profound reassessment of one's own strength and ability to overcome challenges. Interventions focused on recognizing and building personal strength may therefore be particularly effective for women who have experienced traumatic childbirth.

Regarding core beliefs, the mean ratings indicated a small to moderate degree of disruption for core beliefs, and core beliefs were positively correlated with PTGI scores and all its dimensions, which is similar to previous studies of women experiencing pregnancy loss. [37,38] The perineal trauma and lack of partners' presence were significantly related to the disruption of core belief scores. This disruption often causes women to question their previously held beliefs, values, and perspectives. It can lead to a state of cognitive change, confusion, and a revaluation of one's fundamental understanding of themselves and others. So, these findings emphasize the importance of embodied consequences of birth and a lack of social support for women's assumptive beliefs, both of which need to be considered when assessing and supporting women during the childbirth process. Although, there was a significant relationship found between core beliefs and PTG, this finding is not necessarily straightforward or deterministic. Other factors, such as the nature of the traumatic event, age, and education also play significant roles in shaping the process of PTG. [11,39] For example, this relationship may be attributed to the level of perceived stress experienced by women at the moment of birth. In this study, the perceived stress level of the participants was very high at the time of birth, which may indicate a more challenging and distressing birthing experience. [40,41] Furthermore, the study found that perceived stress was positively correlated with only two dimensions of PTG, namely Spiritual Changes and Appreciation of Life. These findings could suggest that high levels of stress during childbirth are potentially more potent in women re-evaluating what is important in life and in terms of their spiritual beliefs, perhaps associated with women's fears of either themselves or their infant's dying during childbirth.

The results also highlight that factors such as education and the type of birth can influence the perceived stress levels experienced. It is possible to hypothesize that more educated women may have more knowledge (e.g., prenatal education) and be more prepared or confident about the childbirth process and, for that reason, perceive less stress when facing these events, given that education has also been shown to be associated with PTG. Also, regarding type of birth, it

is likely that the physical and emotional demands of a caesarean section or the use of forceps or vacuum in vaginal childbirth, along with the presence of other medical interventions, contribute to the increased stress perception of these women. [41] It should be noted that the type of birth was associated with women's inability to experience personal growth after a traumatic childbirth, which alludes to the importance of expectations in how women give birth. Perineal trauma was the most common type of childbirth trauma (28%) and 9% of the sample also highlighted the negative impacts of restricting partner presence - a measure imposed by the pandemic situation. [19,42,43]

This study sought to develop a model for predicting PTG scores. An explanatory model including type of birth, age, disruption of core beliefs, and perceived stress showed a strong relationship between these predictors and PTG I scores. The relationship with age was negative, meaning that older women experienced less PTG, and vaginal birth was associated with more PTG. The analysis revealed that disruption of core beliefs had a significant positive association with PTG scores, while perceived stress had a minimal effect. This may happen because, while perceived stress reflects the subjective evaluation of a stressful experience, core beliefs encompass deep beliefs and assumptions about oneself, others, and the world. Thus, core beliefs provide a framework for individuals to interpret and make sense of their traumatic experiences. Although levels of perceived stress are important in understanding the immediate psychological impact of trauma, they do not directly influence the cognitive and emotional processes that drive PTG, like the disruption of core beliefs. As suggested by the findings, core beliefs seem to be a key influential factor in facilitating the transformative process of PTG. [11]

4.1 Implications

Regarding changes in practices, the fact that almost 30% of the sample experienced perineal trauma and the increasing use of caesarean sections and its association with negative impacts are causes for concern. There is an urgent need to change the paradigm of care for women during childbirth and implement best practices, including strategies to reduce caesarean sections and/or better prepare women for caesareans, as well as minimize any type of trauma, including perineal trauma: this could involve embedding World Health Organization guidelines [44] on facilitating a positive childbirth experience into practice. A further implication concerns the need to implement therapeutic interventions that challenge and modify core beliefs to facilitate growth. This relates to interventions that can help women reframe negative thoughts, cultivate self-compassion, and adopt coping strategies. Through therapeutic

interventions, individuals can reconstruct their worldview, finding new meaning and resilience.[45,46]

For research implications, future research should explore additional factors influencing childbirth stress and PTG. Predictive models need refinement by identifying more variables for PTG prediction, such as self-efficacy and coping styles.

4.2 Limitations

Despite efforts to mitigate limitations, this study has some constraints. The self-selecting sample, obtained online, focused on a specific region (North), and had a higher education level, compared to the general population, which limits the generaliz ability of our findings. Memory and self-report biases, common in cross-sectional studies, could also be present. A further limitation relates to not including other variables that were prevalent during the pandemic, such as delayed skin-to-skin and mother-infant dyad separation.

4.1 Conclusions

This study found that most women reported a minor to moderate disruption to their core beliefs following a traumatic birth, and nearly half of the sample showed substantial PTG. Perineal trauma and lack of partners' presence during birth emphasise the influence of specific trauma-related factors on women's childbirth experiences. The results also showed that the disruption of core beliefs had a significant positive association with PTG, while perceived stress had minimal impact. Thus, disruption of core beliefs was found to be more influential than stress in facilitating PTG. Therapeutic interventions that help to change and reframe beliefs may be helpful in facilitating growth.

References

1. Olza I, Leahy-Warren P, Benyamini Y, et al. Women's psychological experiences of physiological childbirth: a meta-synthesis. *BMJ open*. 2018;8(10):e020347.
2. Benzakour L, Gayet-Ageron A, Jubin M, et al. Traumatic childbirth and birth-related post-traumatic stress disorder in the time of the COVID-19 pandemic: a prospective cohort study. *International journal of environmental research and public health*. 2022;19(21):14246.
3. Mayopoulos GA, Ein-Dor T, Dishy GA, et al. COVID-19 is associated with traumatic childbirth and subsequent mother-infant bonding problems. *Journal of affective disorders*. 2021;282:122-125.
4. Sawyer A, Ayers S. Post-traumatic growth in women after childbirth. *Psychology and Health*. 2009;24(4):457-471.

5. Beck CT, Watson S, Gable RK. Traumatic Childbirth and Its Aftermath: Is There Anything Positive? *J Perinat Educ*. Jun 2018;27(3):175-184. doi:10.1891/1058-1243.27.3.175
6. Mangelsdorf J, Eid M. What makes a thriver? Unifying the concepts of posttraumatic and postecstatic growth. Original Research. *Frontiers in Psychology*. 2015-June-23 2015;6doi:10.3389/fpsyg.2015.00813
7. Ketley R, Darwin Z, Masterson C, McGowan L. Women's experience of post-traumatic growth following a traumatic birth: an interpretive phenomenological analysis. *J Reprod Infant Psychol*. Apr 27 2022:1-12. doi:10.1080/02646838.2022.2070608
8. Heyne C-S, Kazmierczak M, Souday R, et al. Prevalence and risk factors of birth-related posttraumatic stress among parents: A comparative systematic review and meta-analysis. *Clinical psychology review*. 2022;94:102157.
9. Thomson G. Growth and renewal through traumatic birth. *Spirituality and Childbirth: Meaning and Care at the Start of Life*. 2017:142-158.
10. Tedeschi RG, Calhoun LG. The Posttraumatic Growth Inventory: measuring the positive legacy of trauma. *J Trauma Stress*. Jul 1996;9(3):455-471. doi:10.1007/bf02103658
11. Calhoun LG, Tedeschi RG. The Foundations of Posttraumatic Growth: An Expanded Framework. *Handbook of posttraumatic growth: Research & practice*. Lawrence Erlbaum Associates Publishers; 2006:3-23.
12. Aflakseir A, Nowroozi S, Mollazadeh J, Goodarzi MA. The Role of Psychological Hardiness and Marital Satisfaction in Predicting Posttraumatic Growth in a Sample of Women With Breast Cancer in Isfahan. *Iran J Cancer Prev*. Aug 2016;9(4):e4080. doi:10.17795/ijcp-4080
13. Ryninks K, Wilkinson-Tough M, Stacey S, Horsch A. Comparing posttraumatic growth in mothers after stillbirth or early miscarriage. *PLoS One*. 2022;17(8):e0271314. doi:10.1371/journal.pone.0271314
14. Cann A, Calhoun LG, Tedeschi RG, et al. A short form of the Posttraumatic Growth Inventory. *Anxiety Stress Coping*. 2010;23(2):127-137. doi:10.1080/10615800903094273
15. Ramos C, Leal I. Posttraumatic Growth in the Aftermath of Trauma: A Literature Review About Related Factors and Application Contexts. *Psychology, Community & Health*. 03/28 2013;2:43-54. doi:10.5964/pch.v2i1.39
16. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *International Journal of Surgery*. 2014/12/01/ 2014;12(12):1495-1499. doi:https://doi.org/10.1016/j.ijsu.2014.07.013
17. Lev-Wiesel R, Chen R, Daphna-Tekoah S, Hod M. Past traumatic events: are they a risk factor for high-risk pregnancy, delivery complications, and postpartum posttraumatic symptoms? *J Womens Health (Larchmt)*. Jan-Feb 2009;18(1):119-125. doi:10.1089/jwh.2008.0774
18. Ayers S, Bond R, Bertullies S, Wijma K. The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. *Psychological medicine*. 2016;46(6):1121-1134.
19. Hollander MH, van Hastenberg E, van Dillen J, van Pampus MG, de Miranda E, Stramrood CAI. Preventing traumatic childbirth experiences: 2192 women's perceptions and views. *Arch Womens Ment Health*. Aug 2017;20(4):515-523. doi:10.1007/s00737-017-0729-6
20. Huh HJ, Kim KH, Lee H-K, Jeong BR, Hwang JH, Chae J-H. Perceived stress, positive resources and their interactions as possible related factors for depressive symptoms. *Psychiatry Investigation*. 2021;18(1):59.
21. Tedeschi RG, Calhoun LG. Target Article: "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry*. 2004;15(1):1-18. doi:10.1207/s15327965pli1501_01
22. Thomson G, Balaam MC, Nowland Harris R, et al. Companionship for women/birthing people using antenatal and intrapartum care in England during COVID-19: a mixed-methods analysis of

national and organisational responses and perspectives. *BMJ Open*. Jan 11 2022;12(1):e051965. doi:10.1136/bmjopen-2021-051965
23. Verhoeven CJM, Boer J, Kok M, Nieuwenhuijze M, de Jonge A, Peters LL. More home births during the COVID-19 pandemic in the Netherlands. *Birth*. Dec 2022;49(4):792-804. doi:10.1111/birt.12646
24. (PT) DGdS. COVID-19: Fase de Mitigação – Gravidez e Parto. Orientação nº 018/2020.: https://www.cig.gov.pt/wp-content/uploads/2020/10/i026724.pdf; 2020.
25. Favre G, Pomar L, Qi X, Nielsen-Saines K, Musso D, Baud D. Guidelines for pregnant women with suspected SARS-CoV-2 infection. *Lancet Infect Dis*. Jun 2020;20(6):652-653. doi:10.1016/s1473-3099(20)30157-2
26. Widström AM, Brimdyr K, Svensson K, Cadwell K, Nissen E. Skin-to-skin contact the first hour after birth, underlying implications and clinical practice. *Acta Paediatrica*. 2019;108(7):1192-1204.
27. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane database of systematic Reviews*. 2016;(11)
28. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. *Cochrane database of systematic reviews*. 2017;(7)
29. Yildiz PD, Ayers S, Phillips L. The prevalence of posttraumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. *J Affect Disord*. Jan 15 2017;208:634-645. doi:10.1016/j.jad.2016.10.009
30. Ramos C, Leal I, Marôco AL, Tedeschi RG. The Posttraumatic Growth Inventory: Factor Structure and Invariance in a Sample of Breast Cancer Patients and in a Non-Clinical Sample. *Span J Psychol*. Oct 3 2016;19:E64. doi:10.1017/sjp.2016.65
31. Ramos C, Figueiras LGE, Lopes M, Leal IP, Tedeschi RG. Inventário de crenças centrais: estrutura fatorial e propriedades psicométricas na população portuguesa. 2016:
32. Sawyer A, Ayers S. Post-traumatic growth in women after childbirth. *Psychol Health*. Apr 2009;24(4):457-471. doi:10.1080/08870440701864520
33. Babu MS, Chan SJ, Ein-Dor T, Dekel S. Traumatic childbirth during COVID-19 triggers maternal psychological growth and in turn better mother-infant bonding. *J Affect Disord*. Sep 15 2022;313:163-166. doi:10.1016/j.jad.2022.06.076
34. Brandao T, Brites R, Nunes O, Hipolito J. Posttraumatic growth after childbirth in women: a systematic review. *Journal of Clinical Psychology in Medical Settings*. 2020;27:318-330.
35. Sawyer A, Nakić Radoš S, Ayers S, Burn E. Personal growth in UK and Croatian women following childbirth: A preliminary study. *Journal of Reproductive and Infant Psychology*. 05/27 2015;33doi:10.1080/02646838.2014.981801
36. Beck CT, Watson S. Posttraumatic Growth After Birth Trauma: "I Was Broken, Now I Am Unbreakable". *MCN Am J Matern Child Nurs*. Sep-Oct 2016;41(5):264-271. doi:10.1097/nmc.0000000000000259
37. Lafarge C, Mitchell K, Fox P. Posttraumatic growth following pregnancy termination for fetal abnormality: the predictive role of coping strategies and perinatal grief. *Anxiety Stress Coping*. Sep 2017;30(5):536-550. doi:10.1080/10615806.2016.1278433
38. Krosch DJ, Shakespeare-Finch J. Grief, traumatic stress, and posttraumatic growth in women who have experienced pregnancy loss. *Psychol Trauma*. Jul 2017;9(4):425-433. doi:10.1037/tra0000183
39. Zoellner T, Maercker A. Posttraumatic growth in clinical psychology - a critical review and introduction of a two component model. *Clin Psychol Rev*. Sep 2006;26(5):626-653. doi:10.1016/j.cpr.2006.01.008
40. Najjarzadeh M, Abbasalizadeh S, Mohammad-Alizadeh-Charandabi S, Asghari-Jafarabadi M, Mirghafourvand M. Perceived stress and its predictors in women with threatened preterm labour: A cross-sectional study. *Nurs Open*. Jan 2022;9(1):210-221. doi:10.1002/nop2.1055

41. Tan HS, Agarthesh T, Tan CW, et al. Perceived stress during labor and its association with depressive symptomatology, anxiety, and pain catastrophizing. *Sci Rep*. Aug 20 2021;11(1):17005. doi:10.1038/s41598-021-96620-0
42. Shiva L, Desai G, Satyanarayana VA, Venkataram P, Chandra PS. Negative Childbirth Experience and Post-traumatic Stress Disorder - A Study Among Postpartum Women in South India. Original Research. *Frontiers in Psychiatry*. 2021-July-06 2021;12doi:10.3389/fpsyt.2021.640014
43. Viirman F, Hess Engström A, Sjömark J, et al. Negative childbirth experience in relation to mode of birth and events during labour: A mixed methods study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2023/03/01/ 2023;282:146-154. doi:https://doi.org/10.1016/j.ejogrb.2023.01.031
44. Organization WH. *WHO recommendations on intrapartum care for a positive childbirth experience*. World Health Organization; 2018.
45. Gamble J, Creedy D, Moyle W, Webster J, McAllister M, Dickson P. Effectiveness of a counseling intervention after a traumatic childbirth: a randomized controlled trial. *Birth*. Mar 2005;32(1):11-19. doi:10.1111/j.0730-7659.2005.00340.x
46. Abdollahpour S, Keramat A, Mousavi SA, Khosravi A, Motaghi Z. The Effect of Debriefing and Brief Cognitive-Behavioral Therapy on Postpartum Depression in Traumatic Childbirth: A Randomized Clinical Trial. *Journal of Midwifery and Reproductive Health*. 2018;6(1):1122-1131. doi:10.22038/jmrh.2017.10000