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## **A survey of perceived traumatic birth experiences in an Irish maternity sample –prevalence, risk factors and follow up**

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### **Highlights**

- The prevalence of birth trauma in this Irish sample was 18%.
- A trauma-informed approach in maternity services may prevent birth trauma.
- Women who report subjective birth trauma immediately following birth should be able to access ongoing support and care.
- Detailed enquiry about birth trauma at 6 weeks postpartum may help to identify postpartum- PTSD.

## **Abstract**

**Objectives:** To establish the prevalence and correlates of a subjectively traumatic birth experience in an Irish maternity sample.

**Design:** A questionnaire routinely provided to all women prior to hospital discharge post-birth was amended for data collection for this study. Two additional questions seeking information about women's perceptions of their birth were added and analysed. Women who described their birth as traumatic and agreed to follow-up, received a City Birth Trauma Scale (Ayers et al., 2018) at subsequent follow-up (6 to 12 weeks postpartum). Demographic, obstetric, neonatal variables and factors associated with birth trauma were collected from electronic maternity records retrospectively.

**Setting:** A postnatal ward in an Irish maternity hospital which provides postnatal care for public maternity patients.

**Participants:** Postpartum women (N=1154) between 1 and 5 days postpartum.

**Measurements & Findings:** Participants completed the Edinburgh Postnatal Depression Scale (Cox et al., 1987) with two additional questions about birth trauma. Eighteen percent (n=209) of women reported their birth as traumatic. Factors associated with reporting birth as traumatic included a history of depression, raised EPDS scores (>12), induction of labour, combined ventouse/forceps birth, and postpartum haemorrhage. Of these 209 women, 134 went on to complete the City Birth Trauma Scale (Ayers et al., 2018). The average score was 3.84 and only 6 of this sample (4%) reached the threshold for PTSD.

**Key conclusions:** This study identified a prevalence of 18% of women experiencing birth as traumatic and the potentially important role of a current and past history of depression,

postpartum haemorrhage, induction of labour and operative vaginal birth in defining a traumatic birth experience. The majority of women were resilient to birth trauma, few developed post-traumatic stress disorder, but a larger cohort had significant functional impairment associated with sub-clinical postpartum PTSD symptoms.

**Implications for practice:** Maternity care providers should be aware of the risk factors for traumatic birth.

Introducing a trauma – informed approach amongst midwives and maternity care providers in the postnatal period may help to detect emerging or established persisting trauma-related symptoms.

For women with sub-clinical postpartum PTSD symptoms a detailed enquiry may be more effective in identifying postpartum PTSD at a later postnatal stage e.g., at six weeks postpartum. Maternity services should provide ongoing supports for women who have experienced birth trauma.

### **Keywords**

Birth trauma, postpartum PTSD, Ireland, Perinatal, Prevalence, Risk factors.

## Introduction

Being pregnant, having a baby and becoming a mother is a time of huge social, physiological and psychological change and adjustment (Guardino & Schetter, 2014). Most cultures have traditionally viewed the birth of a baby as a positive event however research suggests that for some women birth may be a traumatic experience that can have negative, long-lasting effects on mothers, their infants and partners as well as other family members (Garthus-Niegel et al., 2017).

The phenomenon of psychological trauma following birth is not unique to any healthcare system or country, as similar experiences have been identified in high income countries (e.g., the United Kingdom, the USA, Canada, Australia) and low-and middle-income countries (e.g., Iran, Turkey), with prevalence rates of women experiencing birth as traumatic varying between 20% and 48.3% (Abdollahpour et al., 2017, Ayers et al., 2009, Creedy, Shochet and Horsfall, 2000). This wide range of prevalence rates may reflect methodological differences, definitions of traumatic birth, as well as cultural and healthcare factors.

Traumatic birth has been conceptualised and assessed in different ways, ranging from women's subjective evaluation of their birth, to using diagnostic criteria for what constitutes a traumatic event (American Psychiatric Association, 2014). Beck (2004) argued that traumatic birth is a negative perinatal experience subjectively perceived or evaluated by the woman. Thus, although a clinician may regard a woman's birth as an obstetrically normal event, the mother may perceive her birth as traumatic. A woman's subjective evaluation of her birth experience as traumatic is the principal and paramount viewpoint of her encounter.

A recent expert group consulted with various stakeholders and recommended that traumatic birth be defined as 'A woman'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 a woman's health and wellbeing' (Leinweber et al., 2022). This act of stakeholder engagement and framing of a definition of childbirth trauma reaffirms that research on women's perceptions of trauma is valid and appropriate.

Various factors associated with traumatic birth have been identified. A recent meta-analysis of 28 studies of factors associated with women's subjective perception of childbirth reported that type of birth (e.g., emergency caesarean section and instrumental vaginal birth), medical complications during birth (e.g. severe pain, prolonged labour, complications with infants), inadequate social support, a history of mental health conditions and high-perceived stress (e.g., a feeling of loss of control, unmet expectations) are among the factors that are most closely related to traumatic birth experiences (Chabbert, Panagiotou and Wendland, 2020).

Research has identified that there is a high incidence of healthcare provider mistreatment experienced by women during labour and childbirth in countries where respectful maternity care is not practiced or prioritised (Miller et al., 2016; Taheri et al., 2022). In low resource countries such as Iran, prevalence rates of traumatic birth are over 50% (Modarres et al., 2022). The World Health Organization (WHO, 2018) has recognised that respectful maternity care affords women privacy and dignity, informed consent without coercion and choice. These are central tenets of respectful maternity care. The encounter of disrespectful maternity care has been identified as a global experience (Koblinsky et al., 2016; Sando et al., 2016; Downe et al., 2018), and women are more likely to experience a traumatic birth when they are in receipt of disrespectful maternity care (Morton & Simkin, 2019).

Complications in pregnancy (Abdollahpour et al., 2017; Ghanbari-Homayi et al., 2019; Maggioni, Margola and Filippi, 2006), fear of childbirth (Ghanbari-Homayi et al., 2019,

Henriksen et al., 2017), being subjected to non-evidence based practices such as not being allowed to move around or choose the birth position (Ghanbari-Homayi et al., 2019) as well as higher perfectionism and intolerance of uncertainty (Price, Centifanti and Slade, 2020) have also been associated with traumatic birth. However, uncertainties remain around a number of demographic, obstetric and psychosocial factors including age, ethnicity, parity, use of epidural analgesia, elective caesarean section (CS), episiotomy and postpartum psychopathology (Chabbert, Panagiotou and Wendland, 2020).

The potential impact of traumatic birth is substantial. Traumatic birth is a risk factor for poor perinatal mental health and has been associated with depression (Tani and Castagna, 2017), anxiety (Greenfield, Jomeen and Glover, 2016), post-traumatic stress disorder (PTSD) (Ayers, 2017, Price, Centifanti and Slade, 2020), and suicidal thoughts (Fenech and Thomson; 2014, Howard et al., 2011). A birth appraised as traumatic can trigger clinically significant traumatic stress responses in up to 16.8% of women (Dekel, Stuebe and Dishy, 2017), such as intrusive thoughts and memories about the birth (Ayers, Wright and Ford, 2015, Elmir et al., 2010), avoidance of stimuli that remind women of the trauma (Ayers, McKenzie-McHarg and Eagle, 2007, Byrne et al., 2017), emotional numbness (Ammerman et al., 2011), negative cognitions (Ayers, Wright and Thornton, 2018; Handelzalts, Hairston and Matatyahu, 2018; Nicholls and Ayers, 2001) and hyper-arousal symptoms (Garthus-Niegel et al., 2015, Elmir et al., 2010). Around 3-4% of women will go on to develop postpartum PTSD (Grekin and O'Hara, 2014, Dikmen-Yildiz, Ayers and Phillips, 2017a), indicating that not all traumatic births result in clinical PTSD. The magnitude of traumatic birth, along with other postpartum factors such as the accessibility and quality of provided postpartum care and support, appears to determine resolution or maintenance of PTSD symptoms over time in the postpartum period (Yildiz, Ayers and Phillips, 2017).



Fear of childbirth after a traumatic birth (also called secondary tokophobia) is another direct consequence, which causes some women to consider not having another child (Shorey, Yang and Ang, 2018), delay the interval between births (Gottvall and Waldenström, 2002, Shorey, Yang and Ang, 2018), or request caesarean sections for future births (Nilsson et al., 2012, Shorey, Yang and Ang, 2018).

Importantly, traumatic birth adversely impacts not only the mother, but there is some indication that for some women it might also affect their bond with the infant (Smorti et al., 2020, Suetsugu, Haruna and Kamibeppu, 2020) and their relationship with their partner (Delicate et al., 2018). There is also evidence that some mothers experience poorer health outcomes (Schytt and Waldenström, 2007), use medical services more frequently (Turkstra et al., 2015), decline recommended care (van Heumen et al., 2018, Hollander et al., 2018) and resort to maladaptive coping strategies to deal with the resulting distress (Fenech and Thomson, 2014) following a traumatic birth experience.

Functional impairment, where trauma symptoms affect day to day life, is often observed where symptoms of trauma do not meet the threshold of diagnosis for PTSD (Dikmen-Yildiz et al., 2018; Wallace et al., 2020), this has led some to question the validity of applying the full PTSD criteria in a perinatal setting (Horesh et al., 2021). Overall, the findings of these studies suggest that women's psychological wellbeing is affected by traumatic birth, with increased psychological symptomatology and impaired quality of life among this population, underlining the importance of clinician awareness of this experience, clinical recognition of potential risk factors for the implementation of preventative measures, and then management if women do encounter a traumatic birth.

In 2020, the total number of births in Ireland was 56, 835 (National Women and Infant Health Programme (NWIHP, 2021), a birth trauma prevalence rate of just 20% would mean over 11,000 women in Ireland experience a traumatic birth annually. A prevalence rate of 3% of PTSD would suggest that around 1,700 women in Ireland develop postpartum PTSD every year. Yet currently in Ireland there are no national guidelines for screening for traumatic birth. Screening is not common practice in maternity care internationally (McKenzie-McHarg et al., 2015). However, the Specialist Perinatal Mental Health - Model of Care for Ireland (Health Service Executive, 2017) recognises that birth trauma is a key issue for service-users and recommends enquiry about a history of traumatic birth at the antenatal booking visit, with onward referral to specialist perinatal mental health midwives if detected.

To date, the prevalence of birth trauma in women in Ireland has not been established, this would provide a basis for prevention and intervention programmes. Such information would also help identify areas with greater need for resource allocation and guide policy changes to improve maternal mental health services. Establishing a clear picture of risk factors for traumatic birth will aid in the accurate assessment and follow-up of women with birth trauma in maternity services.

This study was undertaken to estimate the prevalence of subjective birth trauma and identify associated factors in an Irish maternity setting. It also aimed to describe the degree of trauma symptoms and their impact at follow-up. This will hopefully, in turn, inform maternity services and maternity care providers.

## **Methods**

### **Design**

A cross-sectional design was used, with an additional follow-up assessment of women who identified their birth as traumatic. A questionnaire was completed as part of routine postnatal care to identify the prevalence of perceived traumatic birth and associations with depression, demographic and obstetric risk factors. Women who identified their birth as traumatic and agreed to follow-up were invited to complete a City Birth Trauma Scale at 6 to 12 weeks postpartum. This tool has previously been piloted and validated for establishing birth related trauma in postpartum women (Ayers et al., 2018), and it takes approximately ten minutes for women to complete.

### **Ethical Considerations**

The study and research protocol were approved by the Research and Ethics Committee at the Rotunda Hospital, Dublin, Ireland (RAG-2020-003). Women who reported that their birth was traumatic and agreed to follow-up were contacted by an Advanced Midwife Practitioner (AMP), within 6 to 12 weeks. Study information was provided and if women agreed to participate, a verbal consent was established by phone and recorded. The AMP was a member of the Specialist Perinatal Mental Health Service (SPMHS) which is based on-site at the Rotunda Hospital. Any women who reported distress at any stage were offered support from the SPMHS. For women who reported a traumatic birth but did not wish to be followed up for the purpose of the study, they receive standard signposting to the SPMHS which is available by practitioner-referral or self-referral.

### **Sample**

A systematic sample of all eligible women who gave birth in the hospital over a 12-month period from November 2019 to November 2020 was included in the study. Women were eligible if they were one to five days postpartum and could read and understand English.

Women were excluded if they had experienced a stillbirth or neonatal death. A total of 1154 women completed the questionnaire on the day of discharge. An audit of compliance for completing the postnatal questionnaire was undertaken in 2020, which identified a completion rate of 80%. Two hundred and nine reported that their birth was traumatic and were invited for further assessment.

A power calculation was undertaken to calculate the minimum sample size required to establish a reliable prevalence figure. Conventional values for confidence level (95%) and precision (5%) were selected consistent with biomedical studies (Purhoseingholi, 2013). Previous studies have reported the prevalence of birth trauma as 20 to 48%, as above. On this basis, a sample of 246 – 384 participants was required, consistent with our above assumptions. Our sample of 1154 was adequately powered to establish a prevalence of birth trauma based on available literature.

## **Measures**

The postnatal discharge questionnaire was the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) which has been routinely completed by all postnatal women on the day of discharge from the maternity hospital since 2000. A further question ‘do you have a history of depression?’ was added to the questionnaire in 2003. For this study, two additional screening questions were added to the questionnaire to measure birth trauma, as well as depression and mental health history. Demographic and obstetric variables were collected retrospectively from electronic medical records.

*Birth-trauma* was measured with one question, by asking “Do you think your most recent birth was traumatic?” with response options of Yes/No. Respondents who circled ‘yes’ were recorded as experiencing birth trauma, and those who circled ‘no’ were not. If women

indicated their birth was traumatic, they were asked if they would agree to a member of the clinical team contacting them, at a later date (> 6 weeks postpartum) to complete a CBITs.

*Depression* was measured using the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden and Sagovsky, 1987). A cut-off score of 12 or more was used to identify women at risk of developing postnatal depression (Crotty and Sheehan, 2004).

*A history of depression* was measured by an additional question on the questionnaire. 'Do you have a history of depression?' Yes/No

*Demographic, obstetric and neonatal variables* were collected via the electronic maternity chart. Obstetric and neonatal variables included gravida and parity, onset of labour (spontaneous, induced or no labour); analgesia in labour (none, nitrous oxide, pethidine, epidural, combined spinal epidural, general anaesthetic); gestational age at birth, mode of birth (spontaneous vaginal birth, ventouse, forceps, ventouse and forceps, emergency caesarean section, elective caesarean section, born before arrival (BBA) to the maternity unit; obstetric emergency; (none, postpartum haemorrhage (PPH), shoulder dystocia, other); perineal tears (none, 1st degree, 2nd degree, 3rd degree, 4th degree, episiotomy); skin to skin at birth (yes/no); Apgar scores at one and five minutes post birth; neonatal intensive care (NICU) admission (yes/no); maternal high-dependency unit (HDU) admission (yes/ no).

*Postpartum PTSD* was measured using the City Birth Trauma Scale (CBITS), which was developed by Ayers et al. (2018). It is based on the diagnostic criteria described in the Diagnostic and Statistical Manual - version 5 (DSM-5). It is a 29-item questionnaire which has excellent reliability, good psychometric properties, is easily understood and has been validated and used in multiple studies internationally (Handelzalts et al., 2018, Nakić Radoš et al., 2020, Weigl et al., 2021, Sandoz et al., 2021). Scores are calculated by the addition of

results of questions 3-22, each question is scored from 0-3, consequently the questionnaire has a range of 0-60. Higher scores representing greater levels of psychopathology.

The tool provides scores in four domains: five questions about re-experiencing symptoms (e.g., flashbacks, bad dreams), two questions about avoidance symptoms (e.g., avoiding people or places that remind you of the birth), seven questions about negative cognitions and mood (e.g., feeling negative about yourself, feeling detached from other people) and six questions about hyperarousal (e.g., difficulties concentrating, feeling irritable or aggressive). In addition to these, there are two questions relating to the impact of the event at the time it happened, dissociative symptoms such as feeling detached from reality and the duration and impact of symptoms. As deficits need to be present in all domains to warrant a diagnosis of PTSD, women can score very highly but not reach the threshold for diagnosis. Currently there is no numeric cut off that is diagnostic for postpartum PTSD. However, a recent Brazilian study which translated the CBITs for its population identified a cut off score of >28 provided a sensitivity of 72% and specificity of 83% (de Lima Osório et al., 2021).

## **Procedure**

All eligible women were given the questionnaire to complete on the day of discharge from the postnatal ward by midwives working on the postnatal ward as part of routine care. Eligible women included all postnatal women who had given birth to a live baby/ies who could read and understand the English-language questionnaire.

**Phase 1 of data collection** - The researcher collected completed questionnaires from the postnatal ward every day after women were discharged. Demographic and obstetric data were collected retrospectively from the maternal and newborn clinical management system (MN-CMS).

**Phase 2 of data collection** - Women who reported that their birth was traumatic and indicated that they agreed to follow-up were contacted by the researcher at 6 to 12 weeks postpartum and asked if they would like to complete a CBITS.

### **Statistics and Data Analysis**

Data screening and cleaning was performed in order to fulfil the requirement of performing multivariate analysis. Accordingly, assessment of missing data, outliers, multicollinearity and normality were carried out. Logistic regression was used to estimate the association between demographic and obstetric variables and a perceived traumatic birth. Univariate binary logistic regression was conducted with each variable with the binary outcome of Y/N to the question “do you think your most recent birth was traumatic?”. Factors identified as significant in this analysis ( $p < 0.05$ ) were included in a multivariate logistic regression model. Factors which remain significant at this level after adjusting for all variables were retained. The crude odds ratios (ORc) were calculated for the univariate analyses and adjusted odds ratios (ORa) were calculated for multivariate analysis. Due to the smaller sample size of women who completed the follow-up phase, a more limited descriptive analysis was undertaken, with reporting of aggregate score results. All analyses were conducted in SPSS version 27.

## **Results**

### **Sample characteristics**

The median age of women in the total sample was 32 years (IQR 28 - 36) and the median gestational age infants were born at was 39.6 weeks (IQR 38.9 – 40.4). Other sample characteristics are given in Table 1. The median gravida and parity were 2 (IQR 1-3). Most

neonates were well at birth, with median Apgar scores at one and five minutes of 9 and 10 respectively.

### **Birth trauma prevalence and risk factors**

The self-reported prevalence of perceived traumatic birth in this sample was 18% ( $n=209$ ) and the self-reported prevalence of probable depression was 9% ( $n=107$ ). There was some comorbidity with 18% ( $n=38$ ) of the sample reporting both traumatic birth and probable depression.

The associations between demographic, obstetric and infant factors and birth trauma are shown in Table 1. The 'other' ethnicity group predominantly included non-Irish Caucasian women, with a sizeable population from Eastern-Europe.

To determine the key risk factors for birth trauma, factors significantly associated with risk of birth trauma as determined by literature searching, were entered into a hierarchical regression with personal factors entered in the first step (current depression, history of depression, ethnicity), birth-related factors in the second step (induced labour, spontaneous birth, assisted birth, emergency CS, episiotomy, general anaesthesia, postpartum haemorrhage, High Dependency Unit (HDU) admission) and infant related factors in the final step (skin to skin, Neonatal Intensive Care Unit (NICU)).



**Table 1. Demographic and obstetric risk factors and traumatic birth**

		<b>Total sample (N=1154) n (%) <i>mean (SD)</i></b>	<b>Birth trauma (N =209) n (%) <i>mean (SD)</i></b>	<b>Crude OR (OR<sub>c</sub>)</b>	<b>95% CI</b>	<b>P value</b>
<b>Personal factors</b>						
Current depression		107 (9)	38 (18)	<b>2.80</b>	<b>1.83 – 4.31</b>	<b>&lt;.001</b>
History of depression		265 (23)	82 (39)	<b>2.68</b>	<b>1.94 – 3.70</b>	<b>&lt;.001</b>
Maternal age (years)		31.7 (5.7)	31.3 (5.7)	0.94	0.96 – 1.01	0.217
Parity	Primiparous	458 (40)	101 (22)	<b>1.55</b>	<b>1.15 – 2.10</b>	<b>0.004</b>
	Multiparous	696 (60)	108 (16)			
Ethnic group	Irish	672 (58)	145 (22)	<b>1.78</b>	<b>1.29 – 2.45</b>	<b>&lt;.001</b>
	Irish traveller	17 (1)	3 (18)	0.96	0.27 – 3.37	0.955
	African or African Irish	51 (4)	13 (26)	1.58	0.82 – 3.01	0.166
	Asian or Asian Irish	106 (9)	16 (15)	0.78	0.45 – 1.36	0.388
	Roma	7 (1)	2 (29)	1.81	0.35 – 9.38	0.474
	Other	295 (26)	29 (10)	<b>0.41</b>	<b>0.27 – 0.62</b>	<b>&lt;.001</b>
<b>Obstetric factors</b>						
Onset of labour	Spontaneous	527 (46)	87 (17)	0.81	0.59 – 1.10	0.178
	Induced	384 (33)	88 (23)	<b>1.58</b>	<b>1.16 – 2.15</b>	<b>0.030</b>
	No labour	240 (21)	34 (14)	0.69	0.47 – 1.04	0.075
Type of birth	Spontaneous vaginal	591 (52)	86 (15)	<b>0.60</b>	<b>0.44 – 0.81</b>	<b>&lt;.001</b>

Analgesia <sup>a</sup>	Forceps	81 (7)	13 (16)	0.85	0.46 – 1.57	0.607
	Ventouse	54 (5)	14 (26)	1.62	0.86 – 3.03	0.130
	Ventouse and forceps	15 (1)	11 (48)	<b>4.03</b>	<b>1.87 – 9.89</b>	<b>&lt;.001</b>
	Emergency CS	161 (14)	50 (31)	<b>2.35</b>	<b>1.62 – 3.42</b>	<b>&lt;.001</b>
	Elective CS	234 (21)	33 (14)	0.69	0.46 – 1.03	0.700
	Pre-hospital birth	3 (0)	1 (33)	2.26	0.21 – 25.01	0.495
	None	139 (10)	21 (15)	0.78	0.48 – 1.27	0.317
	Pethidine	145 (11)	31 (21)	1.26	0.82 – 1.94	0.284
	Entonox	252 (18)	51 (20)	1.18	0.83 – 1.69	0.336
	Epidural	489 (36)	94 (19)	1.15	0.85 – 1.55	0.380
	Combined Spinal/Epidural	333 (24)	57 (17)	0.90	0.65 – 1.26	0.553
	General anaesthetic	14 (1)	6 (50)	<b>4.61</b>	<b>1.47 – 14.43</b>	<b>0.004</b>
	Intact	580 (50)	109 (53)	1.09	0.81 – 1.47	0.583
	1 <sup>st</sup> degree tear	145 (13)	19 (13)	0.65	0.39 – 1.06	0.09
Perineum <sup>a</sup>	2 <sup>nd</sup> degree tear	200 (16)	31 (16)	0.79	0.53 – 1.21	0.281
	3 <sup>rd</sup> degree tear	16 (1)	3 (19)	1.04	0.29 – 3.68	0.952
	4 <sup>th</sup> degree tear	1 (0)	1 (100)	1.01	0.99 – 1.01	0.034
	Episiotomy	131 (11)	33 (26)	<b>1.61</b>	<b>1.05 – 2.47</b>	<b>0.027</b>
	Episiotomy and tear	90 (8)	18 (20)	1.14	0.66 – 1.95	0.640
	None	1043 (91)	181 (17)	<b>0.59<sup>c</sup></b>	<b>0.37 – 0.94</b>	<b>0.024</b>
	Postpartum haemorrhage	86 (8)	24 (28)	<b>1.84<sup>c</sup></b>	<b>1.12 – 3.03</b>	<b>0.015</b>
Obstetric emergency <sup>a</sup>	Shoulder dystocia	9 (1)	4 (44)	3.65	0.97 – 13.72	0.040
	Other	17 (2)	4 (24)	1.39	0.45 – 4.32	0.564
	HDU admission	25 (2)	9 (38)	<b>2.78</b>	<b>1.19 – 6.43</b>	<b>0.013</b>
<b>Infant Factors</b>						
Gestational age (days)		39.4 (1.9)	39.6 (1.7)	1.05	0.96 – 1.16	0.291
NICU admission		119 (10)	31 (26)	<b>1.73</b>	<b>1.11 – 2.68</b>	<b>0.014</b>

Skin to skin <sup>b</sup>		842 (92)	141 (17)	<b>0.46</b>	<b>0.28 – 0.79</b>	<b>0.004</b>
Apgar	1 minute	8.6 (1.0)	8.4 (1.4)	0.99	0.99 – 1.01	0.459
	5 minutes	9.8 (0.7)	9.8 (0.7)	0.99	0.99 – 1.01	0.490

<sup>a</sup>Non-exclusive categories, n > 1154.

<sup>b</sup>251 did not record data in this category (22%), n= 899.

<sup>c</sup>For each variable of significance in univariate analysis, bivariate correlations were calculated to assess collinearity. Variable pairs with a Pearson correlation coefficient >0.8 were eliminated. R = 0.883 for 'no obstetric emergency' and 'postpartum haemorrhage' pair, and thus the former variable was eliminated from the multivariable regression model.

Results of the final model are shown in Table 2. This shows that when all risk and protective factors were entered into the model, the most significant risk factors for birth trauma were current depression (OR 2.61), previous depression (OR 1.83), induced labour (OR 1.58), assisted vaginal birth (OR 4.38), and postpartum haemorrhage (PPH) (OR 2.01). The greatest risk factor in terms of odds ratios was assisted vaginal birth, however, the 95% confidence intervals for this variable are very wide so this result should be interpreted with caution. The next highest risk factors were current depression and postpartum haemorrhage.

**Table 2. Hierarchical regression model of risk factors for perceived birth trauma**

	Adjusted Odds Ratio (OR <sub>a</sub> )	95% CI	p-value
<b>Block 1: Personal factors</b>			
Ethnicity: Irish	1.28	0.77 – 2.13	0.334
Ethnicity: Other	0.56	0.30 – 1.03	0.061
History of depression	<b>1.83</b>	<b>1.19 – 2.80</b>	<b>0.006</b>
Current depression	<b>2.61</b>	<b>1.47 – 4.61</b>	<b>0.001</b>
Primiparous	1.37	0.90 – 2.06	0.139
<b>Block 2: Birth-related factors</b>			
Induced labour	<b>1.58</b>	<b>1.06 – 2.35</b>	<b>0.023</b>
Spontaneous vaginal birth	0.77	0.49 – 1.20	0.245
Assisted vaginal birth (ventouse/forceps)	<b>4.38</b>	<b>1.59 – 12.05</b>	<b>0.004</b>
Emergency CS	1.61	0.90 – 2.89	0.109
Episiotomy	1.39	0.80 – 2.41	0.240
General anaesthetic	3.61	0.91 – 14.35	0.068
Postpartum haemorrhage	<b>2.01</b>	<b>1.08 – 3.72</b>	<b>0.027</b>
HDU admission	2.35	0.81 – 6.82	0.116
<b>Block 3: Infant-related factors</b>			
Skin to skin	0.95	0.48 – 1.91	0.892
NICU Admission	1.25	0.67 – 2.35	0.479

## Analysis of cohort with subjectively traumatic birth

The demographic characteristics of the 134 women who reported their birth as traumatic and participated in follow-up are described in Table 3. The mean time to follow-up was 74.0 days (SD =33.9). There were no statistically significant differences in terms of mental health history, mental health history at the time of discharge, age parity, perineal injury, HDU admission, skin to skin contact, Apgar scores or gestational age, when comparing women who completed the CBITS to those that were invited to but chose not to.

**Table 3: Demographic, obstetric and infant characteristics of participants who completed the City Birth Trauma Scale.**

Variables	Categories	n (%) N=134
<b>Personal Factors</b>		
History of depression		50 (37.3)
Current depression		23 (17.2)
Maternal Age	17-19	2 (1.5)
	20-24	13 (9.7)
	25-29	37 (27.6)
	30-34	37 (27.6)
	35-39	34 (25.4)
	>40	11 (8.2)
Ethnic Group	Irish	95 (70.9)
	Irish Traveller	2 (1.5)
	African or African Irish	8 (6)
	Asian or Asian Irish	12 (9)
	Roma	1 (0.7)
	Other	16 (11.9)
Parity	Primiparous	72 (53.7)
	Multiparous	62 (46.3)
<b>Obstetric Factors</b>		
Onset of Labour	Spontaneous	58 (43.3)
	Induced	56 (41.8)
	No Labour	20 (14.9)

Type of birth	Spontaneous vaginal	46 (34.6)
	Forceps	7 (5.3)
	Ventouse	11 (8.3)
	Ventouse & forceps	10 (7.5)
	Emergency CS	38 (28.6)
	Elective CS	20 (15)
	Pre-hospital birth	1 (0.8)
Analgesia	None	13 (9.7)
	Pethidine	19 (14.2)
	Entonox	25 (18.7)
	Epidural	44 (32.8)
	Combined	29 (21.6)
	Spinal/Epidural	4 (3)
	General anaesthetic	10 (7.7)
Perineum	Intact	71 (54.6)
	1 <sup>st</sup> degree tear	10 (7.7)
	2 <sup>nd</sup> degree tear	16 (12.3)
	3 <sup>rd</sup> degree tear	2 (1.5)
	4 <sup>th</sup> degree tear	0 (0)
	Episiotomy	21 (16.2)
	Episiotomy and tear	10 (7.7)
Obstetric emergency	None	115 (86.5)
	Postpartum haemorrhage	14 (10.5)
	Shoulder dystocia	2 (1.5)
	Other	2 (1.5)
HDU admission		6 (4.5)
<b>Infant Factors</b>		
Gestational age (days)		39.54 (1.85) <sup>a</sup>
NICU admission		21 (15.8)
Skin to skin		87 (84.5)
Apgar 5		10 (0) <sup>b</sup>

<sup>a</sup>Mean (Standard Deviation)

<sup>b</sup>Median (Interquartile Range)

Thirteen percent of women who completed the CBiTS reported that they believed that they or their baby would be seriously injured and 10% believed that they or their baby would die. Of the 134 women who completed a follow-up CBiTS, 66 scored 0 on the CBiTS at this time. The mean score for the cohort was 3.74 (SD=6.34), the mode was 0 and the median was 1. The mean scores in each of the diagnostic domains and for each question are summarized in Table 4. This demonstrates that hyperarousal symptoms were most frequent, but that all of the other DSM-5 criteria showed symptoms at a similar level. Dissociative symptoms were the least frequently reported. The three questions in which people were most likely to describe symptoms related to, 'feeling tense and on edge' (Q19), 'feeling irritable or aggressive' (Q17) and 'feeling negative about myself or thinking something awful will happen' (Q13). Only six women ( $6/134 = 4\%$ ) reached criteria for PTSD.

The items concerning duration of symptoms were only completed by a small proportion of participants, most likely reflecting the lack of symptoms present in this cohort. Regarding functional impairment, 15% ( $20/134$ ) answered 'yes' or 'sometimes' to the question 'Do these symptoms cause you a lot of distress?' and 6% ( $8/134$ ) answered 'yes' or 'sometimes' to the question 'Do they prevent you doing things you usually do'. No participants attributed symptoms to medication, alcohol, drugs, or physical illness.

Using this method of initial one question screening, followed by targeted assessment at approximately 10 weeks postpartum, the prevalence of PTSD that we identified was  $6/1154$  (0.5%). The number with functionally impairing symptoms who endorsed at least one item on the CBiTS at assessment was  $68/134 = 51\%$ . In this cohort, 49% of women's symptoms had resolved in the weeks following childbirth.

**Table 4: PTSD Criteria Met on CBITS Scale**

<b>Criteria</b>	<b>n (%)</b>
A: Stressor	22 (16.4)
B: Re-experiencing	48 (35.8)
C: Avoidance	19 (14.2)
D: Negative Cog. & Mood	29 (21.6)
E: Hyperarousal	46 (34.3)
F: Duration	43 (32.1)
G: Distress and Impairment	20 (14.9)
H: Exclusion	0 (0)
All Criteria	6 (4.5)

## **Discussion**

### ***Rates of traumatic experience***

The reported prevalence of traumatic birth varies considerably between countries. The prevalence found for traumatic birth is lowest in Iceland (5%); (Sigurdardottir et al., 2017) and Sweden 6.8%; (Waldenström et al., 2004), while it is about 20% in Finland (Uotila et al., 2005), Israel (Halperin, Sarid and Cwikel, 2015), Norway (Henriksen et al., 2017) and the UK (Ayers, Wright and Thornton, 2018). It reaches to around 34% in the USA (Soet, Brack and Dilorio, 2003) and Turkey (Dikmen-Yildiz, Ayers and Phillips, 2017b), with the highest prevalence rates reported in Australia (45%); (Alcorn et al., 2010), and Iran (54.5%); (Modarres et al., 2012). Worldwide variation between studies in prevalence estimates may be partly due to the criteria used for identifying cases of women with traumatic birth, the time of the assessment and nature of the population studied, as well as differences in quality of maternity care and socio-cultural background of countries. While acknowledging the difficulties in obtaining accurate prevalence rates, it is clear that birth is experienced by many women as a traumatic event all around the world. Further cross-national and cross-cultural research may help to establish more accurate prevalence rates of traumatic birth through the use of unified scientific criteria so that more robust and accurate comparisons can be made between studies. The findings are novel in that this is the first study, to our knowledge, determining the prevalence and associated factors of



traumatic birth in an Irish maternity hospital using a systematic sampling method.

### ***Obstetric complications***

The increased risk for women who had assisted vaginal births, induction of labour or PPH to experience birth as traumatic is consistent with some previous studies (Alcorn et al., 2010); (Martinez-Vázquez et al., 2021), but not others (Kountanis et al., 2020); (Larsson et al., 2011). An assisted vaginal birth with forceps or ventouse vacuum extraction is inherently a complicated birth, which can be unexpected and urgent and may be required due to fetal distress, failure to progress in labour, all of which may make women feel distressed (Hildingsson, Karlström and Nystedt, 2013). Assisted vaginal birth is also associated with adverse maternal and infant outcomes including perineal tears, urinary incontinence and infant facial palsy and head injuries (Nkwabong et al., 2011); (Saadia, 2015); (Zaat et al., 2018), which may lead to heightened stress responses during and immediately after birth.

Similarly, PPH is a life-threatening clinical emergency that is associated with a high risk of complications including maternal death. However, the literature is very limited and controversial on whether PPH is a risk factor for birth trauma, and postpartum-PTSD after birth (Steijn et al., 2020). A recent review concluded that there is some evidence that PPH might be linked to post-traumatic stress symptoms PTSS/PTSD, but caution needs to be exerted in the interpretation of this finding due to methodological heterogeneity and small number of studies (Zaat et al., 2018).

Induction of labour has been associated with traumatic birth in previous studies (Baxter, 2020); (Gaudernack et al., 2020) and may contribute to a negative birth experience, particularly if it is unexpected or unplanned; and if women are uninformed and excluded from the decision-making process (Coates et al., 2021); (Waldenström et al., 2004). However, studies have also reported women's subjectively positive birth experiences associated with induction of labour, in particular

where women received good quality support and care from midwives (Akuamoah-Boateng and Spencer, 2018); (Schaal et al., 2019). Given the findings related to induction of labour, assisted vaginal birth and PPH in this sample, it is interesting that although emergency CS was a significant risk factor for traumatic birth in univariate analysis, it did not reach statistical significance in multivariate analysis. This is consistent with some previous studies (Cohen et al., 2004); (Kountanis et al., 2020); but inconsistent with others (Andersen et al., 2012); (Hernández-Martínez et al., 2020) and may also reflect a smaller sample size.

These inconsistent findings on the relationship between induction of labour, assisted vaginal birth, PPH, emergency CS and birth trauma, PTSS/PTSD are probably due to mediating or moderating factors, such as women's pre-existing vulnerabilities or the perceived quality of professional support during labour and birth. Reviews and meta-analyses suggest that childbirth is a highly subjective experience and the impact of obstetric complications, such as induction of labour, assisted vaginal birth, PPH or emergency CS on women's perception of their birth may be mediated by other factors such as perceived support from midwives and other health professionals (Ayers et al., 2016); (Henriksen et al., 2017); (Simpson and Catling, 2016).

### ***Comorbidities***

The finding that a history of depression was associated with traumatic birth is consistent with the importance of women's pre-existing risk or vulnerability factors. A review highlighted that women with previous depression or any other psychological problems may be more likely to perceive their birth as traumatic (Simpson and Catling, 2016). One hypothesis to explain this increased risk of traumatic birth is that women with a history of depression may have cognitive biases which cause them to perceive the world to be more dangerous and events to be more threatening than women without a history of depression (Urban et al., 2018). It is also plausible that having a history of depression may leave women more vulnerable to the effects of

unpredictable or uncontrollable complications of birth, and women may be more likely to report negative cognitive appraisals of their birth. However, these explanations are speculative at this point and further research is needed in this area.

The comorbidity of traumatic birth and current depression is consistent with previous research and systematic reviews (Ayers et al., 2016);(Bell and Andersson, 2016). There is evidence that women are more prone to develop acute stress reactions and depressive symptoms following traumatic birth (Gürber et al., 2012). These suggest that traumatic birth may lead to higher levels of traumatic stress, which may exacerbate symptoms of current depression or re-trigger previous depression (Dekel, Stuebe and Dishy, 2017); (Smorti et al., 2020). Alternatively, traumatic birth itself involves a complex array of stressors, which may precipitate the onset of depressive symptoms (Dekel, Stuebe and Dishy, 2017). It is also possible that traumatic stress and depression may develop simultaneously as responses to traumatic birth.

In this regard, this study reported some degree of comorbidity between traumatic childbirth and depression (18%) shortly after birth, which is consistent with other studies (Dekel et al., 2020) and reviews (Ayers et al., 2016). Although this study and others making simultaneous assessments do not imply a causal relationship between traumatic birth and postpartum depression (Dekel, Stuebe and Dishy, 2017); (Smorti et al., 2020), PTSD has been found to be co-morbid with postnatal depression in some women (Dikmen-Yildiz et al., 2017b). These findings highlight the importance of assessing women's birth experiences soon after birth, which could be followed by screening of traumatic stress symptoms and depression if traumatic birth is indicated.

Finally, bivariate analyses in the present study confirm some previous findings and provide additional evidence that primiparity (Simpson and Catling, 2016), emergency CS (Larsson et al., 2011), general anaesthesia (Lopez et al., 2017), maternal admission to HDU or a baby's admission to a neonatal intensive care unit (NICU) (Sharp et al., 2021), episiotomy, and Irish ethnicity were

independently associated with traumatic birth. However, their effect disappeared in multivariate analyses when these factors were analysed with other `major` variables. While spontaneous vaginal birth, absence of obstetric emergency, skin to skin contact and `other` ethnicity were the factors associated with decreased risk of birth trauma, several of which have received support from the literature to some degree (Handelzalts, Hairston and Matatyahu, 2018); (Hernández-Martínez et al., 2020). No association was found between age, gestational age, Apgar score and birth trauma.

### ***Resilience***

The concept of resilience has received increased interest from researchers, clinicians and policy makers in recent years (Van Haeken et al., 2020). Resilience has been generally understood as the ability to cope with challenges, stresses and adversity in life (Vaughn and Koster, 2015). Although a normal life event, childbirth is an event potentially replete with these elements, and yet as demonstrated in the current study most women did not develop a diagnosable condition of PTSD, perhaps reflecting a woman's ability to rise above adversity (Aburn et al., 2016). Research has identified that many women are resilient following a traumatic birth (Dikmen-Yildiz et al., 2018), and this is a known protective factor in the prevention of PTSD (Kaye et al., 2014; Mautner et al., 2013; Rossman et al., 2017).

A recent qualitative study which explored women's paths towards resilience after a traumatic birth, identified that social support, good communication from midwives during labour and women feeling empowered to talk about their experiences helped to build resilience (Brown et al., 2022). Women described their journey towards resilience as one where they felt empowered and confident (Brown et al., 2022). Fostering this approach in maternity services may help to promote resilience in women who experience a traumatic birth.

### ***Low rates of PTSD and potential reasons***

Rates of PTSD appear to be well below established international norms (Grekin and O'Hara, 2014b); (Yildiz, Ayers and Phillips, 2017) and this requires further investigation. Assessment within a maternity hospital may miss women with PTSD due to symptoms of avoidance. Of the 134 participants who completed a follow-up CBITs in this study, 66 scored 0 on the CBITs ( $66/134 = 49\%$ ). The mean score for the cohort was 3.74 ( $SD=6.34$ ), the mode was 0 and the median was 1. Previous research which validated the CBITs, identified a mean of 11.70 ( $SD 11.06$ ) (Ayers et al., 2018). Participants were routinely screened in this study which could potentially account for scores which were much lower than other reported scores from self-selecting samples (Ayers et al., 2018).

The differences observed between the group who were followed up and those who opted out of follow-up did not indicate major systematic differences which is somewhat reassuring. The initial question about trauma may have been delivered too early and perhaps later follow-up by a public health nurse, General Practitioner or health visitor may be a more appropriate setting to enquire about trauma symptoms. Prevalence rates of trauma in an Irish context should be evaluated using different tools, in different contexts and at different time frames to assess how representative our findings are.

## **Limitations**

There are a number of limitations apparent within this study that need to be acknowledged. A single-item assessment of birth experience does not measure the concept comprehensively. The follow-up data are based only on self-reporting, which is an important limitation in this research. It is not possible to establish a clinical diagnosis of PTSD or depression through the use of self-report alone without clinical interviews (Sandos et al., 2021). However, women experience birth trauma for very different reasons and asking whether they think their birth was traumatic allows

for inclusion of all women regardless of the underlying traumatic element(s) responsible for the traumatic experience.

A psychological assessment shortly after birth may possibly be confounded by early postpartum hormone changes and emotional aftershock/reactions that appear immediately after traumatic events (e.g., denial) (Bryant, 2019) and by intense emotional reactions to having a baby. These may potentially affect the prevalence rates of traumatic birth and depression. Further, the simultaneous assessment of birth experience and depression makes it difficult to make causal interpretations of their relationship; yet this methodology is common in birth trauma literature (Gürber et al., 2012); (Waldenström et al., 2004). In addition, although trauma(s) related to other events and mental health disorders before or during pregnancy may have influenced the appraisal of birth (Ayers et al., 2009); (Simpson and Catling, 2016), a history of trauma or psychological problems was not assessed except for concurrent depression. Data obtained from a single maternity hospital may not also be fully representative of all Irish hospitals, restricting generalizability of findings.

The model of Irish public postnatal maternity care is based on shared care with midwives and obstetricians, as well as General Practitioners and Public Health Nurses. Our study sought to establish the prevalence of traumatic birth in the immediate postpartum period with follow-up in the early postpartum (up to 12 weeks). Although perinatal mental health services are available to all women in the postpartum period on a practitioner or self-referral basis, women who develop delayed postpartum-PTSD symptoms and were managed solely by their GP or did not seek help would not have been included in our sample because they have by then been discharged from hospital care.

Lastly, some of the included variables have fairly wide confidence intervals, limiting the possibility to draw firm conclusions.

However, this study addresses an important gap in the literature by being the first Irish study to quantitatively examine the prevalence and associated factors of traumatic birth. Findings can be considered as suggestive of the prevalence of perceived traumatic birth in an Irish sample. Large sample size, inclusion of women with both high and low-risk births and analysis of a wide range of variables are also notable strengths of the present study.

## **Conclusion**

The results of this study support the literature with regard to a relatively high prevalence of traumatic birth and the potentially important role of a current and past history of depression, PPH, induction of labour and operative vaginal birth in defining a traumatic birth experience. Knowledge of the prevalence of traumatic birth and its factors may be used to raise awareness and to identify areas for future interventions to potentially improve maternal mental health outcomes of childbearing women. Future research may consider exploring birth experiences with a prospective study design by using a multi-method approach which incorporate antepartum and postpartum factors, along with intrapartum variables to advance a more comprehensive conceptualization of traumatic birth.

This paper demonstrates the high level of resilience seen in many women who experience a traumatic birth and may highlight the need to examine targeted interventions towards women who have vulnerabilities. Steps should be taken to enhance resilience.

Trauma symptoms that do not reach the threshold of PTSD appear to still have a highly significant impact on women, as such these may require proactive intervention especially during such a key time as the early postnatal period.

## **Declarations**

*Ethics approval and consent to participate:* Ethical approval was sought from the Research Ethics Committee, Rotunda Hospital, Parnell Square, Dublin 1, D01 P5W9 in October 2019. Ethical approval was granted in January 2020 (RAG-2020-003) to collect data for one year. All methods were carried out in accordance with relevant guidelines and regulations.

*Consent for publication:* Consent for publication was not sought as ethical approval was granted for data collection.

*Availability of data and material:* All data generated or analysed during this study are included in this published article [and its supplementary information files].

*Competing interests:* The authors declare that they have no competing interests.

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*Authors' contributions:* UN SN SA SC RD and PDY contributed to the main body of the text.

SN and SA prepared tables 1 & 2. All authors have read and approved the final manuscript prior to submission.

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