Journal of Affective Disorders 412 (2026) 122092

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Symptom presentation of childbirth-related post-traumatic stress in 31 countries: the INTERSECT study

G. Constantinou [a,*], S. Ayers [a], R. Webb [a], J. Handelzalts [b], D.B. Wright [c], C. Grollman [a], G. Lucas [a], N. Awad-Sirhan [d], K. Baird [e], R. Batool [f], S. Batool [g], R.A. Caparros-Gonzalez [h,ap], G. Chorwe-Sungani [i], A. Christoforou [j], S. Coo [d], R. Costa [k], P. Dikmen-Yildiz [l], B. Ďuríčeková [m], B. Dušová [n], V. Enea [o], S. Garthus-Niegel [p], H. Grundström [q,aq], O. Gureje [r], E. Hadjigeorgiou [s], S.M. Haga [t], A. Horsch [u], C. Ionio [v], G. Jarašiūnaitė-Fedosejeva [w], J. Jomeen [x], M. Kazmierczak [y], J. Lalor [z], M. Matijaš [aa], M. Milosavljevic [ab,ar], U. Nagle [z], S. Nakić Radoš [aa], K. Nieminen [q,aq], B.D. Oladeji [r], F.L. Osório [ac], P. Pawlicka [y], Y. Peled [ad,ao], T.M. Pinto [k], V. Rattaz [u], O. Riklikienė [ae], J. Schellong [af,as,at], V.L. Sigurðardóttir [ag], N.S. Thagunna [ah], M.M. Theme-Filha [ai], Z. Škodová [m], P. Dörr [n], T. Stepisnik Perdih [aj], R.C. Stewart [ak], E.M. Swift [ag], K. Uriko [al], Z. Vally [am], M. Vezmar [ab,ar], H.S. Zedan [an], the INTERSECT Consortium [a,1]

[a] Centre for Maternal and Child Health Research, City St George's, University of London, London, UK
[b] School of Behavioral Sciences, Academic College of Tel Aviv-Yafo, Israel
[c] College of Education, University of Nevada, Las Vegas, USA
[d] Psychology Department, Universidad del Desarrollo, Las Condes, Santiago, Chile
[e] School of Nursing and Midwifery, Faculty of Health, University of Technology, Sydney, Australia
[f] Beaconhouse School System, Beaconhouse Boys Campus, Model Town, Lahore, Pakistan
[g] Department of Psychology, GC University, Lahore, Pakistan
[h] Faculty of Health Sciences, Department of Nursing, University of Granada, Granada, Spain
[i] Department of Mental Health Nursing, School of Nursing, Kamuzu University of Health Sciences, Blantyre, Malawi
[j] Department of Social and Behavioral Sciences, European University Cyprus, Nicosia, Cyprus
[k] Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024, Lisboa, Portugal
[l] Department of Psychology, Kirklareli University, Kirklareli, Türkiye
[m] Department of Midwifery, Jessenius Faculty of Medicine in Martin, Comenius University, Bratislava, Slovakia
[n] Faculty of Medicine, University of Ostrava, Ostrava, Czech Republic
[o] Alexandru Ioan Cuza University, Iasi, Romania
[p] Institute and Policlinic of Occupational and Social Medicine, Faculty of Medicine, TUD Dresden University of Technology, Dresden, Germany
[q] Department of Obstetrics and Gynecology in Norrköping, Linköping University, Linköping, Sweden
[r] Department of Psychiatry, College of Medicine, University of Ibadan, Ibadan, Nigeria
[s] Department of Nursing, School of Health Sciences, Cyprus University of Technology, Limassol, Cyprus
[t] Regional Centre for Child and Adolescent Mental Health, Eastern and Southern Norway, Norway
[u] Institute of Higher Education and Research in Healthcare, University of Lausanne, Lausanne, Switzerland
[v] Trauma Research Unit, Department of Psychology, Catholic University of Milan, Milan, Italy
[w] Department of Psychology, Faculty of Social Sciences, Vytautas Magnus University, Kaunas, Lithuania
[x] Faculty of Health, Southern Cross University, Gold Coast, Australia
[y] Institute of Psychology, Faculty of Social Sciences, University of Gdansk, Gdansk, Poland
[z] School of Nursing and Midwifery, Trinity College Dublin, Ireland
[aa] Department of Psychology, Catholic University of Croatia, Zagreb, Croatia
[ab] Institute of Mental Health, Belgrade, Serbia
[ac] Department of Neurosciences and Behavioral Sciences, Faculty of Medicine of Ribeirão Preto, University of Sao Paulo, Brazil
[ad] The Helen Schneider Hospital for Women, Rabin Medical Center, Petach-Tikva, Israel
[ae] Faculty of Nursing, Department of Nursing, Lithuanian University of Health Sciences, Kaunas, Lithuania
[af] Department of Psychotherapy and Psychosomatic Medicine, Faculty of Medicine, TU Dresden, Dresden, Germany
[ag] Faculty of Nursing and Midwifery, University of Iceland, Reykjavík, Iceland

* Corresponding author at: Centre for Maternal and Child Health Research, School of Health and Medical Sciences, City St George's, University of London, Northampton Square, London, EC1V 0HB, UK.
E-mail address: Georgina.Constantinou@citystgeorges.ac.uk (G. Constantinou).

https://doi.org/10.1016/j.jad.2026.122092
Received 25 March 2026; Received in revised form 2 June 2026; Accepted 4 June 2026
Available online 7 June 2026

[ah] Psychdesk Foundation, Kathmandu, Nepal
[ai] National School of Public Health, Oswaldo Cruz Foundation, Brazil
[aj] School of Advanced Social Studies, Nova Gorica, Slovenia
[ak] Division of Psychiatry, Institute for Neuroscience and Cardiovascular Research, University of Edinburgh, UK
[al] School of Natural Sciences and Health, Department of Psychology and Behavioral Sciences, Tallinn University, Tallinn, Estonia
[am] Department of Clinical Psychology, United Arab Emirates University, Abu Dhabi, United Arab Emirates
[an] Department of Public Health, College of Health Sciences, Saudi Electronic University, Saudi Arabia
[ao] Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel
[ap] Instituto de Investigación Biosanitaria ibs.GRANADA, Granada, Spain
[aq] Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden
[ar] Faculty of Medicine, University of Belgrade, Belgrade, Serbia
[as] University Hospital Carl Gustav Carus, TUD Dresden University of Technology, Dresden, Germany
[at] Institute and Policlinic of Occupational and Social Medicine, Faculty of Medicine, TU Dresden, Dresden, Germany

ARTICLE INFO

Keywords:
PTSD
Postpartum
Pregnancy
Symptom presentation
Screening

ABSTRACT

Background: Childbirth-related post-traumatic stress disorder (CB-PTSD) is an important international health concern. Despite increasing recognition of the public health burden of CB-PTSD, little is known about how CB-PTSD symptoms present across different countries.
Aims: This study examined cross-national differences in CB-PTSD symptom severity and presentation to inform culturally sensitive screening and intervention strategies.
Method: Data were drawn from the International Survey of Childbirth-Related Trauma (INTERSECT) cross-sectional survey of 11,302 women 6–12 weeks postpartum in 31 countries using a standard protocol. CB-PTSD symptoms were assessed using the City Birth Trauma Scale, measuring DSM-5 symptom components (re-experiencing, avoidance, negative cognitions and mood, hyperarousal).
Results: Participants were mostly married, aged 30–34 years, with average household income, and higher education. CB-PTSD symptom severity varied substantially across countries, with the highest mean scores in Pakistan ($M = 23.49$, $SD = 13.23$) and lowest in Nigeria ($M = 1.89$, $SD = 3.66$). Despite these differences, symptom patterns were largely consistent across countries, with avoidance symptoms lowest and hyperarousal symptoms highest. Exceptions were observed in countries with particularly high symptom levels. Decision tree analysis identified avoidance symptoms (>3.1) as the strongest discriminator of CB-PTSD cases vs non-cases ($F(1,11,204) = 4820.54$, $p = .000$), followed by negative cognitions and mood (>10; $F(1,716) = 143.69$, $p = .000$).
Conclusions: While CB-PTSD severity varies internationally, symptom presentation is largely consistent, supporting its relevance as an international construct. Avoidance symptoms were the least commonly endorsed yet the most discriminative for identifying CB-PTSD in decision tree analyses, suggesting they may serve as a useful clinical flag for women who warrant more detailed assessment. Variations in symptom expression in countries with high levels of symptoms highlight the importance of culturally sensitive approaches to screening and assessment.

1. Introduction

Childbirth is a universal experience accompanied by social and cultural norms and expectations. While this experience is positive for some women, others may perceive it to be psychologically traumatic. Meta-analyses suggest that on average one in five women experience childbirth as psychologically traumatic (Xu et al., 2024), and 3 to 5% of women develop childbirth-related post-traumatic stress disorder (CB-PTSD) (Yildiz et al., 2017; Heyne et al., 2022). CB-PTSD is trauma related to labour, birth and the immediate postpartum period (Ayers et al., 2026). The impact of CB-PTSD has been associated with various adverse outcomes not just for women but their infants, and the family's well-being and health (Horsch et al., 2024). For women this includes comorbidity with depression (Dekel et al., 2020) and increased likelihood of fear in subsequent births (Garthus-Niegel et al., 2020). Studies also suggest that it may lead to poorer child development (Garthus-Niegel et al., 2017).

These consequently lead to substantial disease burden and costs to society (Horsch et al., 2024). Most research on CB-PTSD has been conducted in Western countries, despite evidence of higher prevalence rates in non-Western regions. For example, a meta-analysis found CB-PTSD to be more common in Middle Eastern countries compared to Europe (Osório and Borges, 2024). Similarly, an international survey conducted in 31 countries (the INTERSECT study (Ayers et al., 2021)) found that prevalence rates ranged from 1 to 36% (Ayers et al., 2026). These wide-ranging estimates highlight the need for a more comprehensive understanding of CB-PTSD across diverse countries and healthcare contexts.

1.1. CB-PTSD symptom presentation

Despite increasing recognition of the public health burden of CB-PTSD, no research has specifically examined differences in CB-PTSD symptom presentation across countries. A review of PTSD symptoms following other types of traumas concluded that PTSD (as defined by the DSM-5 (American Psychiatric Association, 2014)) has strong cross-cultural validity (Hinton and Lewis-Fernández, 2011), with consistent symptom structures across countries such as Algeria, Cambodia, Ethiopia, and Gaza (Hinton and Lewis-Fernández, 2011; de Jong et al., 2001; North et al., 2005; Fawzi et al., 1997). Nevertheless, differences in symptom expression were also found, with evidence that avoidance symptoms may be less common in some countries or cultures (Marsella et al., 1996; McCall and Resick, 2003), while nightmares (Hinton et al., 2009; Shore et al., 2009) and somatic symptoms (Hinton et al., 2013) may be more prominent in other countries or cultures (Hinton et al., 2009; Shore et al., 2009; Hinton et al., 2013). For example, Native American communities and people from Cambodia hold beliefs about the spiritual importance of nightmares, and traumatised individuals in these contexts tend to report experiencing more troubling nightmares (Hinton et al., 2009; Shore et al., 2009). However, cross-cultural evidence on PTSD presentation is sparse and inconsistent (Hinton and Lewis-Fernández, 2011).

Understanding how CB-PTSD manifests across countries is important for ensuring that diagnostic criteria, screening tools, and interventions

[1] INTERSECT Consortium members are listed in the acknowledgements.

are effective in different healthcare contexts, particularly because symptom presentation for CB-PTSD may differ from that found after other traumas because of normal postpartum factors. Regular contact with the infant may lead to reduced symptoms of avoidance, and hypervigilance towards the infant may contribute to increased hyperarousal symptoms (Ayers et al., 2015). Normative postpartum experiences, such as tiredness and problems concentrating may also affect symptom presentation. There may be between-country differences in exposure to birth trauma and the level of postpartum care. It is therefore important to determine whether CB-PTSD symptom presentations are similar across countries, whether symptoms are reported with equivalent frequency, and whether their inter-relationships remain stable across different countries (Hinton and Lewis-Fernández, 2011).

1.2. Methodological challenges

A key methodological challenge is that differences in CB-PTSD may be influenced by methodological inconsistencies. The use of different assessment tools or different trauma populations makes cross-country comparisons difficult. The INTERSECT study addressed several of these limitations by examining CB-PTSD using the same methodology across multiple countries, enabling comparable examination of CB-PTSD internationally (Ayers et al., 2026; Ayers et al., 2021).

This study therefore aims to examine differences in CB-PTSD symptoms across countries using data from the INTERSECT study to: (1) examine patterns of CB-PTSD symptom components across countries; (2) assess cross-country consistency in the inter-relationships between CB-PTSD symptom components; and (3) determine which symptoms most accurately identify cases and non-cases of CB-PTSD. By addressing these questions, this study will provide a greater understanding of CB-PTSD worldwide, informing culturally sensitive and effective screening and diagnosis across diverse healthcare settings.

2. Method

2.1. Design

The INTERSECT study (www.intersectstudy.org) is a cross-sectional survey of CB-PTSD with women between 6 and 12 weeks postpartum (mean 8.5 weeks, SD 1.9). The protocol was pre-registered (Ayers et al., 2021) and the survey conducted between April 2021 and January 2024 for this dataset INTERSECT 2024 (edition 1) (Ayers et al., 2024).

2.2. Participants

INTERSECT 2024 (edition 1) includes data for 11,302 participants from 31 countries (Ayers et al., 2024). Inclusion criteria were that participants: (1) gave birth in the previous 6–12 weeks; (2) were legally adults in the country they resided in (i.e., aged 16 or 18 or older); and (3) gave their informed written or verbal consent to participate in INTERSECT and for anonymised data to be part of the international dataset. Sample sizes ranged from n = 127 (Chile) to n = 1644 (Germany).

2.3. Procedures

Ethical approval was obtained by principal investigators in each participating country. The consent form and participant information sheet were translated and adapted as needed to align with local contexts. The survey followed a standardised protocol (Ayers et al., 2021) but principal investigators had the option to include additional measures or embed the survey within a larger non-interventional study, provided adherence to core procedures was maintained. To ensure comparability, inclusion criteria, sampling methods, and survey content were consistent across countries. Variations to protocol occurred in Germany where obstetric details were taken from medical records rather than self-report, and in Norway and Slovenia, where social media was used as an additional recruitment method.

2.3.1. Participant recruitment and data collection

Participants were recruited through routine maternity services (e.g., hospitals, clinics, birth centres) to minimise self-selection bias and enhance sample representativeness. Research teams approached potential participants in person, via phone, video call, or email, providing them with study information. Those who consented to participate completed surveys between 6 and 12 weeks postpartum using an online platform, paper-based forms, or telephone interviews.

2.3.2. Survey measures and translation

The INTERSECT survey was developed in English and included validated questionnaires as well as newly developed items. If validated translations were not available questionnaires were translated using international guidelines (Wild et al., 2005).

CB-PTSD symptoms were assessed using the City Birth Trauma Scale (Ayers et al., 2018), a 29-item measure aligned with DSM-5 diagnostic criteria, which specifically evaluates PTSD symptoms related to labour, birth, or the immediate postpartum period. It assesses stressor criteria (2 items) and PTSD symptom components of: re-experiencing (5 items); avoidance (2 items); negative cognitions and mood (6 items); and hyperarousal (7 items). Factor analytic studies of this scale suggest two symptom clusters (Ayers et al., 2018; Caparros-Gonzalez et al., 2021; Fameli et al., 2023; Sandoz et al., 2022; Osório et al., 2022; Riklikienė et al., 2024) of birth-related symptoms (all re-experiencing and avoidance symptoms plus three symptoms of negative cognitions and mood) and general symptoms (remaining negative cognitions and mood symptoms and all hyperarousal symptoms). Symptoms are rated on a four-point scale of frequency in the past week scale ranging from 0 (“not at all”) to 3 (“5 or more times”). Scores were summed, with a total possible total score ranging from 0 to 60, where higher scores indicate more severe CB-PTSD symptoms. To enable comparability between symptom subscales and remove the effect of different subscales having different numbers of items, analysis for aims 1 and 2 used means for CB-PTSD symptom subscales (range 0–3), rather than total scores. Total scores were used in analysis for aim 3.

Diagnostic cases of CB-PTSD were calculated according to DSM-5 criteria of birth involving the threat of severe injury or death to the participant or their baby and the participant reporting they had experienced at least 1 re-experiencing, 1 avoidance, 2 negative cognitions and mood, and 2 hyperarousal symptoms at least once in the previous week. The scale has strong reliability and psychometric properties (Ayers et al., 2018; Caparros-Gonzalez et al., 2021; Fameli et al., 2023; Sandoz et al., 2022; Osório et al., 2022; Riklikienė et al., 2024), with good internal consistency in this sample (total symptoms $\alpha = 0.93$; re-experiencing $\alpha = 0.86$; avoidance $\alpha = 0.79$; negative cognitions and mood $\alpha = 0.82$; hyperarousal $\alpha = 0.84$; birth-related symptoms $\alpha = 0.90$; general symptoms $\alpha = 0.90$).

Demographic and obstetric data included age, ethnicity, household income, education, relationship status, and immigration status. Obstetric data were self-reported by participants and included number of children, gestational age, time since birth, mode of birth (vaginal, instrumental vaginal, emergency or elective caesarean), maternal complications, and infant complications. Maternal and infant complications were self-reported by participants as none, minor complications or major complications.

2.3.3. Data management and security

Data were collected and coded following a standardised data dictionary. Anonymised datasets were transferred to City St. George's, University of London, via a secure Microsoft Teams site. A data protection impact assessment was approved by City St. George's, University of London, and research governance procedures were upheld through clear protocol guidance and data-sharing agreements between partner institutions.

2.4. Analysis

Data from each country were cleaned and standardised to ensure consistency in coding and formatting. Cases that did not meet the eligibility criterion of survey completion within 6–12 weeks postpartum (or where this timeframe could not be precisely determined) were excluded (n = 1025; range per country: 0–223). To preserve analytical flexibility, all other records were retained, even if some variables contained missing data. To protect participant anonymity, potentially identifiable details were aggregated: maternal age and number of previous children were converted into categorical groups, and infant date of birth was reduced to month and year. Once a country's dataset was fully aligned with the INTERSECT framework, it was integrated into the final international dataset (INTERSECT 2024 edition 1, n = 11,302). The dataset is available via the UK Data Service (Ayers et al., 2024).

For the analysis reported here, cases were removed if there were more than six missing values for the B-E symptom components of CB-PTSD (n = 108). This left less than 0.2% of the sample with missing values, which were counted as zeroes when the mean values for the components were calculated. When calculating Cronbach's alphas the correlation matrices were created using pairwise complete observations. The analytic approach for the first two aims was similar, using estimates of symptoms using the conditional modes calculated from multilevel models. The conditional modes are estimates of the population means in these countries, which tend to be more accurate than just using the sample means (Efron and Morris, 1977; Wright and London, 2009). For the first aim we compared these across countries. For the second aim, we examined whether the order of the conditional modes calculated for the different symptom components was the same across countries. For the third aim, decision tree analysis was conducted to predict cases and non-cases of diagnostic CB-PTSD from scores on symptom subscales using QUEST (Quick, Unbiased, Efficient Statistical Tree), a binary split method using ANOVA F-tests for continuous predictors to select variables. Decision tree analysis is often classified as a machine learning technique as it focuses more on prediction than understanding (Hastie et al., 2009). This approach ensures unbiased variable selection and produces compact trees that are less prone to overfitting (*IBM SPSS Statistics for Windows, Version* 31, 2021; Therneau et al., 2025; Song and Lu, 2015). Levels for the decision tree were not initially constrained but as symptom scores under 1 do not meet diagnostic criteria that a symptom has to be present, results are reported for a model constrained to three levels. To assess the stability of the decision tree, we performed bootstrap aggregation (bagging) with 10,000 resampled datasets.

Analyses were conducted with R statistical software version 4.4.1 (R Core Team, 2023) and SPSS version 31.0.1.0 (*IBM SPSS Statistics for Windows, Version* 31, 2021).

3. Results

Modal sample characteristics were that participants were married, aged 30 to 34 years, with average household income, and higher education. A small percentage were from ethnic or racial minority groups (9.7%) or not residing in their country of birth (10.4%). On average, half of participants were primiparous (51.3%) and 29.5% of participants underwent emergency or elective caesarean sections, 64.3% had vaginal births, and 6.2% had instrumental vaginal births. Detailed information on sample characteristics for each country can be found in supplementary materials provided and is also reported elsewhere (Ayers et al., 2026). In addition, characteristics for those who met criteria for CB-PTSD and those who did not meet criteria, as well as descriptive statistics for CB-PTSD symptoms in different countries are given in supplementary materials.

Fig. 1 shows the conditional means for total CB-PTSD symptoms across countries from the highest to the lowest. Total symptoms in most countries were low compared to the possible range of 0 to 60, which reflects the positive skew usually found when assessing psychopathology symptoms in the general population.

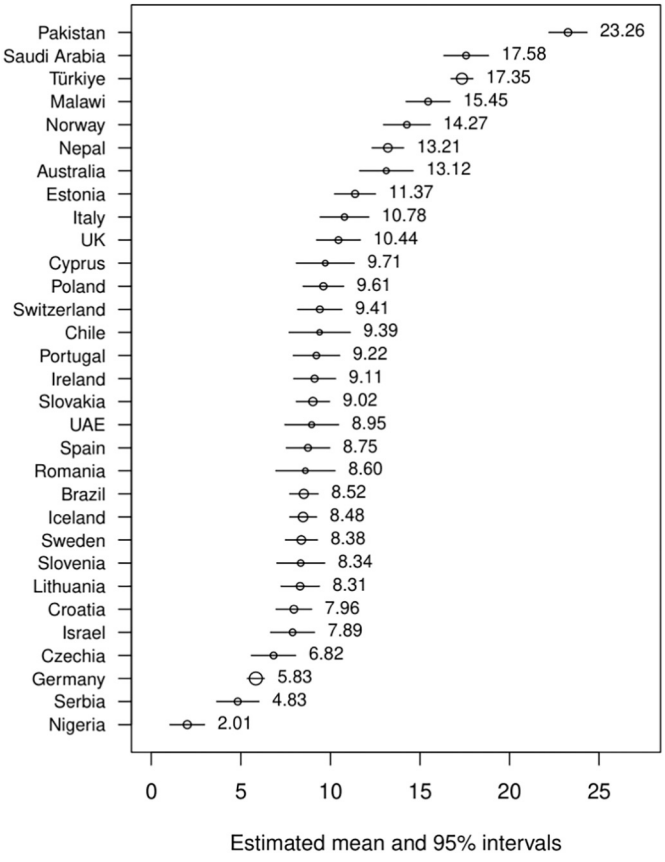

Fig. 1. Conditional means for total CB-PTSD symptoms.
Note: UAE, United Arab Emirates; UK, United Kingdom; Sample size is indicated by the size of the circle.

3.1. Aim 1. Examine patterns in CB-PTSD symptoms across countries

Patterns of CB-PTSD symptoms were examined for: (i) DSM-5 symptom components and (ii) birth-related and general symptom clusters. Fig. 2 shows the conditional means for the four DSM-5 symptom components of re-experiencing, avoidance, negative cognitions and mood, and hyperarousal. These are based on mean scores for each subscale to enable direct comparison between symptom components. Conditional means are displayed across countries using the same order as Fig. 1, from highest to lowest total CB-PTSD symptoms. In most countries, avoidance symptoms were lowest (M = 0.63, SD = 1.35) and hyperarousal symptoms highest (M = 3.86, SD = 4.14). Symptoms of re-experiencing (M = 2.31, SD = 3.29) and negative cognitions and mood (M = 3.17, SD = 4.06) fell in between levels of avoidance and hyperarousal symptoms.

Fig. 2 also shows the conditional means of the two CB-PTSD clusters of birth-related symptoms and general symptoms (range 0–3). This shows that the relative pattern of these symptoms across countries is broadly similar, with birth-related symptoms being lower than general symptoms in most countries. The exceptions to this were Malawi and Nigeria.

Most countries had the same relative order of avoidance and hyperarousal symptoms, except for Malawi, Nepal, Nigeria, Pakistan, Saudi Arabia, and Serbia. These exceptions were countries with the highest or lowest mean symptoms overall. However, it is difficult to infer anything from countries with low symptoms (i.e., Nigeria and Serbia) because of the small absolute difference between conditional means for

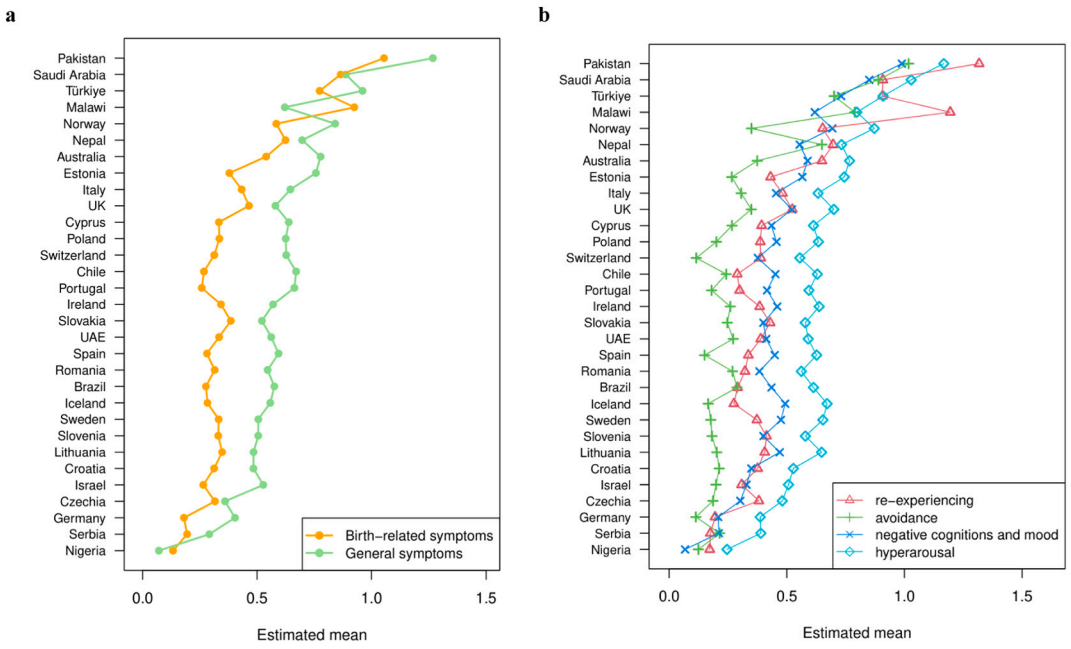

Fig. 2. Condition means for CB-PTSD symptom clusters.
a. Birth-related and general CB-PTSD symptoms.
b. Re-experiencing, avoidance, negative cognitions & mood, and hyperarousal symptoms.

the different symptom components.

3.2. Aim 2. Cross-country consistency in relationships between CB-PTSD symptoms

Table 1 shows the median correlation (underlined), minimum and maximum correlations between different CB-PTSD components, and their interquartile ranges (IQR). Countries with the lowest and highest correlations are listed in brackets. Median correlations between CB-PTSD components ranged from 0.31 to 0.69, with the largest correlations between re-experiencing and avoidance symptoms (0.69, IQR 0.63–0.72), and negative cognitions and mood and hyperarousal symptoms (0.71, IQR 0.67–0.75). Results show that, although the IQR for most correlations was narrow, the range of correlations was wide. The highest correlations between symptoms were in Saudi Arabia, whereas the lowest correlations were found in various countries (Australia, Croatia, Cyprus, Switzerland).

Table 1
Correlations between CB-PTSD symptoms (minimum, 1st quartile, median (underlined), 3rd quartile, maximum).

	Re-experiencing	Avoidance	Negative cognitions and mood
Avoidance	0.55, 0.63, 0.69, 0.72, 0.90 (Australia, Saudi Arabia)		
Negative cognitions and mood	0.45, 0.52, 0.59, 0.65, 0.92 (Cyprus, Saudi Arabia)	0.35, 0.45, 0.51, 0.60, 0.88 (Croatia, Saudi Arabia)	
Hyperarousal	0.20, 0.30, 0.38, 0.45, 0.86 (Cyprus, Saudi Arabia)	0.16, 0.26, 0.31, 0.41, 0.84 (Cyprus, Saudi Arabia)	0.51, 0.67, 0.71, 0.75, 0.92 (Switzerland, Saudi Arabia)

NB. Countries in brackets are those with the lowest and highest correlations.

3.3. Aim 3. Identifying cases and non-cases of CB-PTSD

Those who met criteria for a diagnosis of CB-PTSD (cases: n = 713) had higher mean symptoms (M = 32.58, SD = 11.05, range 7–60) than those who did not meet criteria (non-cases: n = 10,462; M = 8.39, SD = 9.08, range 0–60). Decision tree analysis (Fig. 3) to identify CB-PTSD cases and non-cases from symptom scores showed that avoidance symptoms were most discriminative, with 48.5% of participants who scored >3.1 having CB-PTSD and 96.5% of participants who scored ≤3.1 being non-cases (nodes 1 and 2; $F = 4820.54$, df 1,11204, p = .000). Negative cognitions and mood entered the decision tree next with 66.6% of participants with avoidance symptoms >3.1 plus negative cognition and mood symptoms >10 having CB-PTSD (node 6; $F = 143.69$, df 1,716, p = .000). Results also identified a subgroup of participants with CB-PTSD who had low avoidance symptoms (2.1–3.0) but high reexperiencing symptoms (>10.3), with 65.1% of participants in this group having CB-PTSD (node 10). The range of symptom scores also indicates that there were a few participants in the non-cases group who had high symptoms scores but did not meet diagnostic criteria.

The overall accuracy of the decision tree was good for non-cases, with 98.6% of non-cases identified, but less accurate for CB-PTSD cases, with 39.6% of cases identified. Bootstrap aggregation with 10,000 resampled datasets showed that avoidance was selected as the root node in 7710 cases (77.10%; 95% CI: 76.27–77.91%), indicating that avoidance was consistently identified as the most informative predictor for the first split.

4. Discussion

This study evaluated the consistency of CB-PTSD across 31 countries to understand CB-PTSD symptom presentation internationally and inform screening and assessment across diverse healthcare settings. Findings show that, although the severity of symptoms varied across countries, the pattern of symptom components was broadly similar, as was the relationship between symptom components. Notable exceptions in symptom patterns were found in countries with high levels of symptoms, highlighting potential country-level influences on symptom severity and expression.

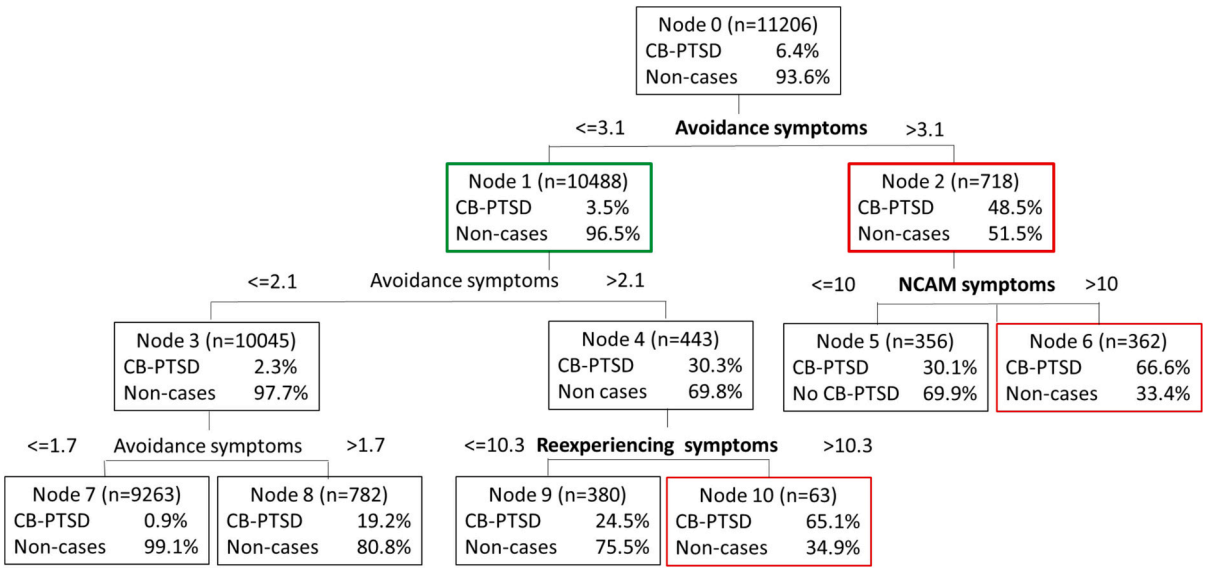

Fig. 3. Decision tree model for identifying CB-PTSD cases and non-cases.

A key finding was that avoidance symptoms were least frequent across countries yet most discriminative for identifying CB-PTSD cases. The low levels of avoidance found here align with previous CB-PTSD research and may be due to normal postpartum factors, such as the presence of the infant, which make it difficult for women to avoid reminders of the birth (Ayers et al., 2015). It is also consistent with cultural variation in avoidance observed in other trauma-exposed populations (Marsella et al., 1996; McCall and Resick, 2003).

Avoidance symptoms were a robust and stable predictor of CB-PTSD cases, with almost half (48.5%) of those scoring more than 3.1 having CB-PTSD. Conversely, low avoidance symptoms (3.1 or less) identified almost all (96.5%) of the participants who did not meet criteria for CB-PTSD. More cases of CB-PTSD were identified by combining high avoidance symptoms (>3.1) and high negative cognitions and mood symptoms (>10). Overall, the decision tree model identified 2 in 5 cases of CB-PTSD (39.6%). The remaining 3 in 5 cases varied in symptom presentation, as illustrated by a small group of CB-PTSD cases with low avoidance symptoms but high reexperiencing symptoms.

In contrast, hyperarousal symptoms were most frequently endorsed but did not enter the decision tree model. This may be because some hyperarousal symptoms (such as hypervigilance towards the infant) are normal in the postpartum period. They may be further confounded by normative postpartum experiences, such as tiredness and problems concentrating. This finding is consistent with previous research showing hyperarousal symptoms are reported by many women after birth, irrespective of whether they experienced a traumatic birth (Ayers et al., 2015). The current study extends this to show high levels of hyperarousal postpartum are evident across many countries. Hyperarousal symptoms therefore appear to have poor specificity for CB-PTSD diagnosis.

Differences in symptom expression found in countries with high levels of CB-PTSD could be due to a number of factors, including cultural differences in trauma exposure, beliefs about trauma expression or childbirth, as well as structural inequalities in maternity care, or measurement invariance. For example, countries with higher levels of CB-PTSD may differ in exposure to obstetric trauma, interpersonal violence, conflict, healthcare instability, or prior traumatic experiences, any of which could influence both symptom thresholds, symptom expression, and/or interpretation of questionnaire items.

4.1. Clinical implications

These findings have a number of clinical implications. The relatively consistent pattern of CB-PTSD symptoms across countries suggests it is a robust and distinct perinatal mental health condition. This suggests that assessment tools, such as the City Birth Trauma Scale, are broadly applicable internationally. High levels of hyperarousal in most countries suggest that CB-PTSD screening programmes need to accurately assess clinically significant distress over and above common postpartum responses.

The importance of symptoms of avoidance in predicting cases of CB-PTSD mean avoidance symptoms could be a useful brief screen and clinical flag to identify: (1) those who do not need onward referral and (i.e. no or low avoidance symptoms) (2) those where a more detailed assessment is warranted (i.e. high avoidance symptoms). It is not clear if the importance of avoidance symptoms as a diagnostic indicator is specific to CB-PTSD or a general effect. There is evidence that avoidance coping predicts PTSD severity over time in other populations, including survivors of assault (Lam et al., 2024) and complex PTSD (Pineles et al., 2011). Further research is needed to explore this further and to determine the most effective way to identify the CB-PTSD cases not primarily characterised by high symptoms of avoidance and negative cognitions and mood. A more detailed screening approach or assessment may be required to identify these particular cases.

Differences in symptom expression found in countries with high levels of CB-PTSD suggest that assessment tools may need refining for use in some contexts to ensure they adequately capture distress in populations where there are high levels of exposure to trauma and CB-PTSD. The identification of these countries also highlights the need for targeted perinatal mental health interventions in these settings. Global initiatives, such as the Millennium Development Goals, emphasise the importance of improving maternal health, including the recognition and management of mental health conditions following childbirth (United Nations, 2000). Integrating CB-PTSD screening into routine maternal healthcare could help address disparities in diagnosis and support. Additionally, the World Health Organization's (2015) call for the prevention and elimination of disrespect and abuse during facility-based childbirth underscores the need for trauma-informed care that recognises the psychological impact of negative birth experiences (World Health Organization, 2015). Addressing both systemic and cultural barriers to perinatal mental healthcare will help improve maternal wellbeing worldwide (Ayers et al., 2024).

4.2. Public health and policy considerations

The presence of distinct symptom patterns in certain countries – particularly those with high symptom severity - suggests that cultural, social, and systemic factors such as greater exposure to trauma and/or poorer healthcare influence the expression of CB-PTSD symptoms. Understanding both universal and culturally specific aspects of CB-PTSD is important if we are to provide appropriate care and prevent CB-PTSD. These findings support the inclusion of maternal trauma indicators within broader maternal health monitoring frameworks and international quality-of-care initiatives. Maternity care providers need to be equipped with knowledge about the different ways CB-PTSD symptoms can be expressed to avoid underdiagnosis or misdiagnosis. Given the high symptom burden in some countries, expanding access to trauma-informed healthcare should be a priority for policymakers (Ayers et al., 2024).

4.3. Future research directions

Further research to replicate and extend these findings is needed to better understand the cultural social, and systemic factors influencing CB-PTSD symptom expression both within and across countries. One example is to explore whether somatic complaints or culturally specific emotional expressions affect CB-PTSD assessments in certain regions or populations. Qualitative studies could provide insights into how people from different cultural backgrounds perceive and report childbirth-related trauma. Longitudinal research could help determine whether certain symptoms, such as hyperarousal, persist over time or are part of early postpartum changes. Psychometric studies of cultural invariance will provide additional information on how well assessment tools perform across different countries and cultures.

Another important area of investigation is the intersection of cultural and systemic factors in shaping CB-PTSD. Research is needed to examine how differences between countries in maternity care, birth interventions, and social support contribute to cross-cultural variations in CB-PTSD symptom patterns. Understanding these factors will be important in developing effective, culturally informed screening and intervention strategies.

4.4. Strengths and limitations

The strengths of the INTERSECT study are that it used a standardised method and measures, enabling direct comparison across 31 countries. Limitations include those inherent to self-report surveys, such as the possibility of reporting biases and the cross-sectional, observational approach. Samples from each country were not necessarily representative of that country, as data collection took place in single or multiple settings within each country. In addition, our analyses used country as one possible indicator of culture, however, there are many different cultures within countries so our research is likely to subsume multiple cultures. Data were collected during the COVID-19 pandemic and the impact of the pandemic on maternity care and CB-PTSD would have varied depending on the timing of recruitment and data collection. Some countries may have sampled participants who gave birth under very restrictive conditions. However, although this may have affected the severity of symptoms observed in some countries, it is unlikely to have affected the pattern of symptom presentation. Finally, analyses focused on the identification of diagnostic cases. However, participants may experience substantial symptoms without meeting formal diagnostic criteria, as evidenced by the full range of symptom scores observed within the 'non-case' group. As a result, the use of diagnostic status alone may overlook meaningful variation in symptom severity and potentially underestimate the prevalence of clinically significant symptoms within the sample.

4.5. Conclusion

These findings show that CB-PTSD symptoms are experienced internationally. While symptom severity varied across countries, the pattern of CB-PTSD symptoms was relatively consistent, suggesting it is a meaningful construct internationally. Avoidance symptoms were the least commonly endorsed yet the most discriminative for identifying CB-PTSD, suggesting they may serve as a useful clinical flag for those who warrant more detailed assessment. However, variations in symptom expression in some countries, particularly those with high levels of symptoms, highlight the importance of culturally sensitive approaches to screening and diagnosis. Future research should continue to explore these differences to inform more inclusive and effective perinatal mental health strategies worldwide.

CRediT authorship contribution statement

G. Constantinou: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Conceptualization. **S. Ayers:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **R. Webb:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation, Conceptualization. **J. Handelzalts:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation, Data curation, Conceptualization. **D.B. Wright:** Writing – review & editing, Formal analysis. **C. Grollman:** Writing – review & editing, Data curation. **G. Lucas:** Writing – review & editing, Supervision, Methodology, Conceptualization. **N. Awad-Sirhan:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **K. Baird:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **R. Batool:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **R.A. Caparros-Gonzalez:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **G. Chorwe-Sungani:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **A. Christoforou:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **S. Coo:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **R. Costa:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **P. Dikmen-Yildiz:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **B. Ďuríčeková:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **B. Dušová:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **V. Enea:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **S. Garthus-Niegel:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **H. Grundström:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **O. Gureje:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **E. Hadjigeorgiou:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **S.M. Haga:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **A. Horsch:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **G. Jarašiūnaitė-Fedosejeva:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **J. Jomeen:** Writing – review & editing, Validation,

Supervision, Resources, Project administration, Investigation, Data curation. **M. Kazmierczak:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **J. Lalor:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **M. Matijaš:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **M. Milosavljevic:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **U. Nagle:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **S. Nakić Radoš:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **K. Nieminen:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **B.D. Oladeji:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **F.L. Osório:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **P. Pawlicka:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **Y. Peled:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **T.M. Pinto:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **V. Rattaz:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **O. Riklikienė:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **J. Schellong:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **V.L. Sigurðardóttir:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **N.S. Thagunna:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **M.M. Theme-Filha:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **Z. Škodová:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **P. Dörr:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **T. Stepisnik Perdih:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **R.C. Stewart:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **E.M. Swift:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **K. Uriko:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **Z. Vally:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **M. Vezmar:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation. **H.S. Zedan:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Data curation.

Funding

The International Survey of Childbirth-Related Trauma (INTERSECT, www.intersectstudy.org) was conducted by the INTERSECT Consortium, funded by the Miriam de Senarclens Fondation and City St. George's, University of London. Funding was also obtained in some countries for the survey to be conducted in that country (listed below). Views expressed are those of the authors and not necessarily those of the funding organisations or the INTERSECT Consortium.

Croatia: Study in Croatia was funded and supported by an approved research project of the Catholic University of Croatia: "Determinants, outcomes, and interrelation of mental and physical health during pregnancy and postpartum (MumHealth)".

Chile: Funding in Chile was provided by ANID under the project "Fondecyt de Iniciación 11170338" and by research funding from the Psychology Department at Universidad del Desarrollo.

G**ermany:** Funding in Germany was provided by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation; GA 2287/7-1 and SCHE 1986/6-1)

Portugal: HEI-Lab are funded by FCT - Fundação para a Ciência e Tecnologia, I.P. through the project with the reference UIDB/05380/2020 and DOI identifier doi:10.54499/UIDB/05380/2020. Raquel Costa is funded by the European Social Fund and FCT – Fundação para a Ciência e a Tecnologia, I.P. (Individual CEEC 2023.06934.CEECIND; doi:10.54499/2023.06934.CEECIND/CP2877/CT0001).

Iceland: The study in Iceland was funded and supported by University of Iceland Research Fund.

Sweden: The Swedish study was supported by Fredrik och Ingrid Thurings Stiftelse, award number 2020-0056.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The INTERSECT Consortium includes the authors and the following members who were part of the research teams conducting INTERSECT in each country:

- Stephanie **Alves**, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Carmen **Amezcua-Prieto**, Faculty of Medicine, University of Granada, Spain.
- Stefanía Birna **Arnardóttir**, Primary Health Care of the Capital Area, Iceland.
- Pablo **Asensio-Pastor**, Hospital Universitario Poniente, Spain.
- Ruveyde **Aydin**, Department of Nursing, Faculty of Health Sciences, Ondokuz Mayis University, Samsun, Türkiye.
- Jovana **Bacigalupo**, Institute of Mental Health, Belgrade, Serbia.
- Barbara **Baranowska**, Department of Midwifery, Centre of Postgraduate Medical Education, Warsaw, Poland.
- Stefano **Bianchi**, S. Giuseppe Hospital, University of Milan, Milan, Italy.
- Maja **Brekalo,** Department of Psychology, Catholic University of Croatia, Zagreb, Croatia
- Annette **Briley**, College of Nursing and Health Sciences, Flinders University, SA, Australia.
- Jelena **Buzejic**, Institute of Mental Health, Belgrade, Serbia.
- Magdalena **Chrzan-Dętkoś**, University of Gdansk, Faculty of Social Sciences, Institute of Psychology, Gdansk, Poland.
- Giulia **Ciuffo**, Trauma Research Unit, Catholic University of Milan, Italy.
- Suzana **Drobnjak**, The Obstetrics and Gynaecology Clinic Narodni Front, Belgrade, Serbia
- James **Ekhindi**, Reproduction and Perinatal Centre, Faculty of Medicine and Health, University of Sydney, Australia.
- Shannon **Everest**, Southern Cross University, Gold Coast, Queensland, Australia.
- Daniela **Fidalgo**, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Deborah **Fox**, School of Nursing and Midwifery, Faculty of Health, University of Technology Sydney, NSW, Australia.
- Beata **Gidaszewski**, Westmead Hospital, Sydney, NSW, Australia.
- Tina Jakše, Moja dula, Slovenia.

- Elaine **Jefford**, School of Health, University of Sunshine Coast, Queensland, Australia.
- Inês **Jongenelen**; Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Hallfríður Kristín **Jónsdóttir**, National University Hospital, Reykjavik, Iceland.
- Teodora **Jovanovic**, Institute of Mental Health, Belgrade, Serbia.
- Asta **Kirkilytė**, Department of Obstetrics and Gynaecology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania.
- Zeljka **Kosutic**, Institute of Mental Health, Belgrade, Serbia.
- Diogo **Lamela**, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Antonia **Letnic**, Psychology Department, Universidad del Desarrollo, Las Condes, Santiago, Chile.
- Bojana **Lukic**, Institute of Mental Health, Belgrade, Serbia.
- Linda Bára **Lýðsdóttir**, Reykjavik University, Iceland.
- Anna **Malmquist**, Department of Behavioral Sciences and Learning, Linköping University, Linköping, Sweden.
- Julia **Marsden**, Southern Cross University, Gold Coast, Queensland, Australia.
- Pablo L. **Martin-Tortosa**, Hospital Materno-Infantil, Malaga, Spain.
- Marijana **Matijaš**, University Department of Psychology, Catholic University of Croatia, Croatia.
- Amera **Mojahed**, Institute and Policlinic of Occupational and Social Medicine, Faculty of Medicine, TUD Dresden University of Technology, Dresden, Germany,.
- Ana **Morais**, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Natalia **Murawska**, University of Gdansk, Faculty of Social Sciences, Institute of Psychology, Gdansk, Poland.
- Elizabeth **Mwangala**, Department of Mental Health Nursing, School of Nursing, Kamuzu University of Health Sciences, Malawi.
- Valentin **Offredi**, University Department of Child and Adolescent Psychiatry, Lausanne University Hospital, Lausanne, Switzerland.
- Dharmintra **Pasupathy**, Department of Women's Health, Westmead Hospital, Reproduction and Perinatal Centre, Faculty of Medicine and Health, Sydney University, NSW, Australia.
- Shayna K. **Pierce**, Department of Psychology, University of Manitoba, Canada.
- Maria **Reyes-Morillas**, Centro Salud Gongora, Granada, Spain.
- Agostina **Rinon**, Psychology Department, Universidad del Desarrollo, Las Condes, Santiago, Chile.
- Blanca **Riquelme-Gallego**, Faculty of Health Sciences, University of Granada, Spain.
- Dangyra **Ruseckienė**, Department of Obstetrics and Gynaecology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania.
- Lara **Seefeld,** Department of Psychotherapy and Psychosomatic Medicine, Faculty of Medicine, TUD Dresden University of Technology, Dresden, Germany.
- Annabel **Sheehy**, School of Nursing and Midwifery, Faculty of Health, University of Technology Sydney, NSW, Australia.
- Lucie **Sikorová**, Faculty Hospital Ostrava, Ostrava, Czechia.
- Metka **Skubic**, Faculty of Health Sciences, University of Ljubljana, Slovenia.
- Valerie **Slavin**, Gold Coast University Hospital, Queensland, Australia.
- Matilde **Sousa**, Lusófona University, HEI-Lab: Digital Human-Environment Interaction Labs, Campo Grande 376, 1749-024 Lisboa, Portugal.
- Greta **Sten**, Department of Obstetrics and Gynecology, Vrinnevihospital, Norrköping, and Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden.
- Rachael **Woodworth**, School of Nursing and Midwifery, Faculty of Health, University of Technology, Sydney, NSW, Australia.
- Maja **Žutić**, Department of Psychology, Catholic University of Croatia.

Appendix A. Ethical approvals

Country	Principle investigator	Ethics committee	Date of approval
Australia	Julie Jomeen & Kathleen Baird	Health and Medical Research Ethics Committee (Human) Reference: RES22/1554	12/10/2022
Brazil	Flávia L. Osorio	National Research Ethics Commission – CAAE: 49192921.6.1001.5440	13/01/2022
Chile	Natalia Awad Sirhan	Comité de Ética Institucional de Investigación (CEII), Universidad del Desarrollo	10/08/2022
Croatia	Sandra Nakić Radoš	Ethics Committee of the Catholic University of Croatia. Reference: Class: 641-03/21-03/21; No: 498-16/2-22-04	03/02/2022
		Committee: Ethics Committee of the Clinical Hospital "Sveti Duh" Reference: No: 012-1539	21/04/2022
Cyprus	Eleni Hadjigeorgiou	Cyprus National Bioethics Committee Reference: 2022.01.195	25/08/2022
Czechia	Bohdana Dušová	Committee: The Ethics Committee of Faculty of Medicine, University of Ostrava. Reference: 15/2021	24/05/2021
Estonia	Kristiina Uriko	Ethics Committee of Tallinn University. Reference: 24	24/09/2021
Germany	Susan Garthus Niegel & Julia Schellong	Technische Universität Dresden Ethikkommission / Technical University of Dresden Ethics Committee Reference: EK 139042016	04/12/2019
Iceland	Valgerður Lísa Sigurðardóttir	The National Bioethics Committee in Iceland	14/12/2022
Ireland	Joan Lalor	The Rotunda Hospital Dublin Research Ethics Committee Reference: REC-2021/021 and Faculty of Health Research Ethics Committee, Trinity College Dublin.	08/12/2021
Israel	Jonathan Handelzalts	Ethics Committee, School of Behavioural Sciences, Tel Aviv-Yafo Academic College Reference: 2022157	09/05/2022
Italy	Chiara Ionio	Research Ethics Committees of both the Catholic University of Milan (reference: 05-22) and S. Giuseppe Hospital in Milan (reference: 550/2022)	21/01/2022 10/11/2022

(*continued on next page*)

(*continued*)

Country	Principle investigator	Ethics committee	Date of approval
Lithuania	Olga Riklikiene	Kaunas Regional Biomedical Research Ethics Committee Reference: BE-2-117	05/10/2021
Malawi	Genesis Chorwe-Sungani & Elizabeth Mwangala	The College of Medicine Research and Ethics Committee (COMREC) Reference: P.02/22/3589	12/05/2022
Nepal	Narendra Thagunna	Nepal Health Research Council	12/10/2022
Nigeria	Oye Gureje & Bibi Oladeji	UI/UCH Research Ethics Committee	17/11/2021
Norway	Silje Marie Haga	Regional Committees for Medical and Health Research Ethics, Region South-East B, reference: 275370.	04/11/2021
Pakistan	Syeda Shahida Batool	Committee: Institutional Bioethics Committee Reference: GCU/IIB/243	24/05/2021
Poland	Paulina Pawlicka	The Ethics Board for Research Projects at the Faculty of Social Sciences, University of Gdansk Reference: 20/2022	20/10/2022
Portugal	Raquel Costa	A Comissão de Ética e Deontologia para a Investigação Científica da Universidade Lusófona (CEDIC_FPED) Reference: RC000121	29/09/2022
Romania	Violeta Enea	The Ethics Commission for Research within the Faculty of Psychology and Education Sciences	20/10/2021
Saudi Arabia	Haya Zedan	King Fahad Medical City Institutional Review Board Reference: 22-258E	07/08/2022
Serbia	Maja Milosavljevic	Etički odbor Instituta za mentalno zdravlje / Ethics Committee of the Institute for Mental Health	14/09/2021
Slovakia	Zuzana Škodová	Ethics Committee of Jessenius School of Medicine, Comenius University in Martin	29/06/2021
Slovenia	Tjasa Stepisnik Perdih	The Commission for Research Ethics (KER) Reference: KER 01082022.	01/08/2022
Spain	Rafael A. Caparros-Gonzalez	Comité de Ética de la Investigación Biomedica de la Provincia de Granada (CEIM/CEI GRANADA)	05/10/2021
Sweden	Hanna Grundström	Etikprövningsmyndigheten /Swedish Ethical Review Authority Reference: 2021-03968; 2021-05611-02	20/08/2021 09/11/2021
Switzerland	Antje Horsch	Commission Cantonale d'Ethique de la Recherche sur L'Etre Humain Reference: 2022-00284	09/06/2022
Türkiye	Pelin Dikmen-Yildiz	Karadeniz Teknik Universitesi Rektorlugu Tip Fakultesi Bilimsel Arastirmalar Etik Kurulu / Black Sea Technical University Rectation Type Fakultesi Scientific Research Ethics Committee	21/10/2021
UAE	Zahir Vally	Social Sciences Ethics Sub-Committee Reference: ERS_2021_8426	26/01/2022
UK	Rebecca Webb	Health Research Authority, West of Scotland Research Ethics Committee 3. Reference: 22/WS/0066	12/07/2022

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2026.122092.

Data availability

Data and supporting documentation for the INTERSECT study (2024) are available through the UK Data Service: SN: 9295, Doi:https://doi.org/10.5255/UKDA-SN-9295-1, URL: https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=9295.

References

American Psychiatric Association, 2014. Diagnostic and Statistical Manual of Mental Disorders : DSM-5. American Psychiatric Association. DSM.

Ayers, S., Wright, D.B., Ford, E., 2015. Hyperarousal symptoms after traumatic and nontraumatic births. J. Reprod. Infant Psychol. 33 (3), 282–293. https://doi.org/10.1080/02646838.2015.1004164.

Ayers, S., Wright, D.B., Thornton, A., 2018. Development of a measure of postpartum PTSD: the City Birth Trauma Scale. Front. Psychiatry 9, 409. Published 2018 Sep 18. https://doi.org/10.3389/fpsyt.2018.00409.

Ayers, S., Handelzalts, J., Webb, R., Lucas, G., Constantinou, G., et al., 2021. International survey of childbirth-related trauma (INTERSECT). In: Research Registry 6439. Available at https://www.researchregistry.com/browse-the-registry#home/registrationdetails/5ffc7453702012001b80a58c/. (Accessed 27 November 2024).

Ayers, S., Horsch, A., Garthus-Niegel, S., et al., 2024. Traumatic birth and childbirth-related post-traumatic stress disorder: international expert consensus recommendations for practice, policy, and research. Women Birth 37 (2), 362–367. https://doi.org/10.1016/j.wombi.2023.11.006.

Ayers, S., Handelzalts, J., Webb, R., Constantinou, G., Grollman, C., Lucas, G., , et al.the INTERSECT Consortium, 2026. International prevalence of childbirth-related post-traumatic stress disorder: the INTERSECT study. Br. J. Psychiatry. In Print.

Ayers, S., Handelzalts, J., the INTERSECT Consortium, 2024. INTERSECT: International Survey of Childbirth-related Trauma, 2021–2024 [Data Collection]. https://doi.org/10.5255/UKDA-SN-9295-1. UK Data Service. SN: 9295.

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. Psychol. Trauma 13 (5), 545–554. https://doi.org/10.1037/tra0001007.

de Jong, J.T., Komproe, I.H., Van Ommeren, M., et al., 2001. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. JAMA 286 (5), 555–562. https://doi.org/10.1001/jama.286.5.555.

Dekel, S., Ein-Dor, T., Dishy, G.A., Mayopoulos, P.A., 2020. Beyond postpartum depression: posttraumatic stress-depressive response following childbirth. Arch. Womens Ment. Health 23, 557–564.

Efron, B., Morris, C., 1977. Stein's paradox in statistics. Sci. Am. 236, 119–127.

Fameli, A.L., Costa, D.S.J., Coddington, R., Hawes, D.J., 2023. Assessment of childbirth-related post-traumatic stress disorder in Australian mothers: psychometric properties of the City Birth Trauma Scale. J. Affect. Disord. 324, 559–565. https://doi.org/10.1016/j.jad.2022.12.123.

Fawzi, M.C., Pham, T., Lin, L., et al., 1997. The validity of posttraumatic stress disorder among Vietnamese refugees. J. Trauma. Stress. 10 (1), 101–108. https://doi.org/10.1023/a:1024812514796.

Garthus-Niegel, S., Ayers, S., Martini, J., von Soest, T., Eberhard-Gran, M., 2017. The impact of postpartum post-traumatic stress disorder symptoms on child development: a population-based, 2-year follow-up study. Psychol. Med. 47, 161–170.

Garthus-Niegel, S., Horsch, A., von Soest, T., et al., 2020. Posttraumatic stress symptoms following childbirth: associations with prenatal attachment in subsequent pregnancies. Arch. Womens Ment. Health 23, 547–555.

Hastie, T., Tibshirani, R., Friedman, J., 2009. The Elements of Statistical Learning. Data Mining, Inference, and Prediction, Second Edition. https://doi.org/10.1007/978-0-387-84858-7.

Heyne, C.S., Kazmierczak, M., Souday, R., et al., 2022. Prevalence and risk factors of birth-related posttraumatic stress among parents: a comparative systematic review and meta-analysis. Clin. Psychol. Rev. 94, 102157. https://doi.org/10.1016/j.cpr.2022.102157.

Hinton, D.E., Lewis-Fernández, R., 2011. The cross-cultural validity of posttraumatic stress disorder: implications for DSM-5. Depress. Anxiety 28 (9), 783–801. https://doi.org/10.1002/da.20753.

Hinton, D.E., Hinton, A.L., Pich, V., Loeum, J.R., Pollack, M.H., 2009. Nightmares among Cambodian refugees: the breaching of concentric ontological security. Cult. Med. Psychiatry 33 (2), 219–265. https://doi.org/10.1007/s11013-009-9131-9.

Hinton, D.E., Kredlow, M.A., Pich, V., Bui, E., Hofmann, S.G., 2013. The relationship of PTSD to key somatic complaints and cultural syndromes among Cambodian refugees attending a psychiatric clinic: the Cambodian Somatic Symptom and Syndrome Inventory (CSSI). Transcult. Psychiatry 50 (3), 347–370. https://doi.org/10.1177/1363461513481187.

Horsch, A., Garthus-Niegel, S., Ayers, S., et al., 2024. Childbirth-related posttraumatic stress disorder: definition, risk factors, pathophysiology, diagnosis, prevention, and treatment. Am. J. Obstet. Gynecol. 230 (3S), S1116–S1127. https://doi.org/10.1016/j.ajog.2023.09.089.

IBM SPSS Statistics for Windows, Version 31, 2021. IBM Corp., Armonk, N.Y., USA.

Lam, S.K.K., Ng, A.S.Y., Zhou, C.R., Hung, S.L., Fung, H.W., 2024. Persistence and psychological predictors of ICD-11 complex PTSD: a six-month longitudinal study in Hong Kong. J. Loss Trauma 29 (5), 544–564.

Marsella, A.J., Friedman, M.J., Gerrity, E.T., Surfield, R.M., 1996. Ethnocultural aspects of PTSD: some closing thoughts. In: Marsella, A.J., Friedman, M.J., Gerrity, E.T., Scurfield, R.M. (Eds.), Ethnocultural Aspects of Posttraumatic Stress Disorder: Issues, Research, and Clinical Applications. American Psychological Association, Washington, DC, pp. 529–538.

McCall, G.J., Resick, P.A., 2003. A pilot study of PTSD symptoms among Kalahari Bushmen. J. Trauma. Stress. 16 (5), 445–450. https://doi.org/10.1023/A:1025702326392.

North, C.S., Pfefferbaum, B., Narayanan, P., et al., 2005. Comparison of post-disaster psychiatric disorders after terrorist bombings in Nairobi and Oklahoma City [published correction appears in Br J Psychiatry. 2005 Sep;187:293. Kim, You-Seung [added]]. Br. J. Psychiatry 186, 487–493. https://doi.org/10.1192/bjp.186.6.487.

Osório, F.L., Borges, M.M., 2024. Posttraumatic stress disorder prevalence and childbirth: update meta-analysis after the introduction of the DSM-5 and COVID-19 pandemic. Arch. Womens Ment. Health 27 (3), 337–357. https://doi.org/10.1007/s00737-024-01423-7.

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. J. Psychosom. Obstet. Gynaecol. 43 (3), 374–383. https://doi.org/10.1080/0167482X.2021.1977278.

Pineles, S.L., Mostoufi, S.M., Ready, C.B., Street, A.E., Griffin, M.G., Resick, P.A., 2011 Feb. Trauma reactivity, avoidant coping, and PTSD symptoms: a moderating relationship? J. Abnorm. Psychol. 120 (1), 240–246.

R Core Team, 2023. R: A Language and Environment for Statistical Computing [Computer Software Manual]. Vienna, Austria. Retrieved from. https://www.R-project.org/.

Riklikienė, O., Jarašiūnaitė-Fedosejeva, G., Sakalauskienė, E., Luneckaitė, Ž., Ayers, S., 2024. Translation and validation of the City Birth Trauma Scale with Lithuanian postpartum women: findings and initial results. Eval. Health Prof. https://doi.org/10.1177/01632787241239339. Published online March 12.

Sandoz, V., Hingray, C., Stuijfzand, S., Lacroix, A., El Hage, W., Horsch, A., 2022. Measurement and conceptualization of maternal PTSD following childbirth: psychometric properties of the City Birth Trauma Scale-French Version (City BiTS-F). Psychol. Trauma 14 (4), 696–704. https://doi.org/10.1037/tra000106.

Shore, J.H., Orton, H., Manson, S.M., 2009. Trauma-related nightmares among American Indian veterans: views from the dream catcher. Am. Indian Alsk. Native Ment. Health Res. 16 (1), 25–38. https://doi.org/10.5820/aian.1601.2009.25.

Song, Y.Y., Lu, Y., 2015 Apr 25. Decision tree methods: applications for classification and prediction. Shanghai Arch. Psychiatry 27 (2), 130–135.

Therneau, T., Atkinson, B., Ripley, B., 2025. rpart: Recursive Partitioning and Regression Trees. R package version 4.1.24. https://CRAN.R-project.org/package=rpart.

United Nations, 2000. Millenium Development Goal 5: Improve Maternal Health. Available online. https://www.un.org/millenniumgoals/maternal.shtml. (Accessed 7 May 2024).

Wild, D., Grove, A., Martin, M., et al., 2005. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. Value Health 8 (2), 94–104. https://doi.org/10.1111/j.1524-4733.2005.04054.x.

World Health Organization, 2015. The Prevention and Elimination of Disrespect and Abuse During Facility-based Childbirth. World Health Organisation, Geneva. https://apps.who.int/iris/bitstream/handle/10665/134588/WHO_RHR_14.23_eng.pdf.

Wright, D.B., London, K., 2009. Multilevel modelling: beyond the basic applications. Br. J. Math. Stat. Psychol. 62, 439–456. https://doi.org/10.1348/000711008X327632.

Xu, Y., Wang, W., Zhou, L., et al., 2024. Systematic review and meta-analysis of prevalence and risk factors for psychological birth trauma. Nurs. Res. https://doi.org/10.1097/NNR.0000000000000792. Published online November 28.

Yildiz, P.D., Ayers, S., Phillips, L., 2017. The prevalence of posttraumatic stress disorder in pregnancy and after birth: a systematic review and meta-analysis. J. Affect. Disord. 208, 634–645. https://doi.org/10.1016/j.jad.2016.10.009.