



## A curated selection of abstracts from papers presented at 1<sup>st</sup> International TREASURE Conference (COST Action 22114)

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### Birth satisfaction and perinatal stress–related psychological outcomes in incarcerated and community mothers: A cross-sectional study from the Czech Republic

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#### ABSTRACT

**Background:** Birth satisfaction is shaped by social context and may be linked to maternal perinatal stress, particularly in marginalized populations. We compared birth satisfaction and related psychological outcomes in incarcerated and non-incarcerated mothers. **Methods:** In a nested retrospective cross-sectional design, 55 incarcerated women who had given birth prior to imprisonment and 79 women from the population in the Czech Republic completed a standardized pencil-and-paper survey. Birth satisfaction (Birth Satisfaction Scale–Revised), self-esteem and posttraumatic stress symptoms were assessed; survey-mode effects were examined in the community sample. **Results:** Incarcerated women reported higher birth satisfaction than women from the community. Within the prison sample, higher birth satisfaction correlated positively with self-esteem and negatively with posttraumatic stress symptoms. No significant survey-mode differences emerged in the community data. **Conclusions:** Birth satisfaction and its associations with perinatal stress–related outcomes appear context dependent. Methodological alignment is needed to allow valid comparisons between socially marginalized and general populations.

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### Maternal mental health, coping and birth-related experiences among postpartum women in Cyprus: Mind the Mum project

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#### ABSTRACT

**Background:** Maternal mental health is a critical public-health priority, yet research from Cyprus remains limited. This study examined postpartum depression, anxiety, well-being, coping strategies, breastfeeding self-efficacy and birth satisfaction among mothers in Cyprus. **Methods:** A cross-sectional survey was conducted among 474 mothers, forming part of the first phase of the Mind the Mum project. Data were collected through an online questionnaire and through recruitment supported by midwives during routine consultation meetings. The questionnaire pack of standardised instruments included the Edinburgh Postnatal Depression Scale (EPDS), Generalized Anxiety Disorder scale (GAD-7), WHO-5 Well-Being Index, Birth Satisfaction Scale–Revised (BSS-R),

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Breastfeeding Self-Efficacy Scale (BSES) and Brief COPE. **Results:** Probable postpartum depression (EPDS  $\geq 13$ ) was identified in 36.8% of participants, while 31% scored in the moderate–severe range for anxiety. Low well-being (WHO-5) affected 42.3%. Higher depressive and anxiety symptoms were strongly associated with elevated stress, lower well-being, maladaptive coping and reduced breastfeeding self-efficacy. Regression models explained 58% of variance in well-being and 63% in depressive symptoms, with adaptive coping and breastfeeding confidence emerging as significant protective factors. Multiparous women showed better psychological outcomes than primiparous mothers and exclusive breastfeeding was linked to lower depression and higher well-being. Women with prior mental-health diagnoses and those experiencing maternal or neonatal complications showed substantially higher distress. **Conclusions:** The findings reveal a substantial burden of postpartum psychological vulnerability and highlight the need for accessible, structured psychosocial support. These results provide essential evidence to guide the next stage of the Mind the Mum project, informing the design of a targeted empowerment programme that strengthens well-being.

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## Postpartum anxiety in Spain: Identification of risks and protective factors in puerperality

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### A B S T R A C T

**Background:** Postpartum anxiety affects a significant proportion (approximately 10%) of women, negatively impacting maternal health and child development. The objective was to identify factors associated with the risk of anxiety in Spanish postpartum women. **Methods:** A cross-sectional study was conducted in Spain. Sociodemographic, clinical and obstetric data, were assessed. The risk of anxiety was measured using the GAD-7. Adjusted odds ratios (aOR) were used to determine the association with risk factors. **Results:** A total of 302 postpartum women participated. Problems during pregnancy (aOR 2.16) and prior psychiatric treatment (aOR 4.67) were found to significantly increase the risk of postpartum anxiety. Conversely, advanced maternal age (aOR 0.88) acted as a protective factor. **Conclusions:** Exist a critical need to implement targeted preventative programs and intensified surveillance for postpartum women with a psychiatric history or who have experienced pregnancy problems, in order to mitigate the risk of developing postpartum anxiety.

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## Maternal anxiety and depression symptoms during pregnancy and child behaviour problems: A multi-cohort study of biopsychosocial moderators

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### A B S T R A C T

**Background:** Intrauterine exposure to maternal anxiety and depression may have lasting effects on child behaviour, such as internalising and externalising behaviours. However, not all children are affected equally by their mothers' depression or anxiety symptoms during pregnancy, and various biopsychosocial moderators have been proposed. **Methods:** This multi-cohort study, combining data from four European cohorts ( $N = 7,597$ ), investigated the moderating role of six biopsychosocial factors in the associations of maternal depression and anxiety symptoms during pregnancy with child internalising and externalising behaviour at 3–5 years of age. **Results:** Preliminary results suggest that depression symptoms during pregnancy predict child internalising behaviour, with this association being stronger for girls. Trait anxiety symptoms during pregnancy predict child externalising behaviour. State anxiety symptoms during pregnancy predict child internalising behaviour, and this effect is stronger for first-born children. **Conclusions:** These findings give indications of which children may be more susceptible for intrauterine exposure of maternal anxiety and depression.

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## Parental perinatal stress: Challenges of preterm birth and war in Ukraine

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### A B S T R A C T

**Background:** Parents of preterm newborns in Ukraine have traumatic war experiences and high levels of stress associated with preterm birth. **Methods:** A survey was conducted of 215 Ukrainian women who gave birth prematurely after the start of the war in Ukraine, using a modified “Distress Thermometer for Parents” (DT-P). The mean DT-P value was  $6.93 \pm 0.17$  points. The most common emotional problems were feelings of tension (88.4 %), fears (86.9 %), sleep disturbances (79.1 %), poor control over emotions (65.1 %), depression (51.2 %), etc. In 74.4 % of cases, women indicated that they needed long-term professional psychological support. **Conclusions:** It is critically necessary to continue scientific research to deeply understand the long-term impact of war-related stress in pregnant women, newborn children, and the entire family.

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## Relationship between stress, anxiety and psychopathological symptoms in a sample of Spanish pregnant women

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### A B S T R A C T

**Background:** Pregnant women are vulnerable to stress and anxiety, which may increase the risk of developing psychopathological symptoms that negatively impact their health and that of their baby. **Methods:**  $N = 70$  women in their third trimester of pregnancy were recruited at Hospital of Jaén (Spain). We collected sociodemographic data, perinatal stress with Prenatal Distress Questionnaire Revised (NuPDQ), anxiety with Perinatal Anxiety Screening Scale (PASS), and psychopathological symptoms with Symptom Assessment-45 Questionnaire (SA-45). U-Mann Whitney, linear and binary regressions were used, covarying by age, number of miscarriages and first-time pregnancy. **Results:** Anxiety and stress predicted higher scores on the SA-45 dimensions: obsession-compulsion (PASS:  $B = 0.07$ ,  $t = 3.5$ ,  $p < 0.001$ ;  $R^2 = 0.3$ ), somatization (PASS:  $B = 0.07$ ;  $t = 2.3$ ,  $p = 0.022$ ; NuPDQ:  $B = 0.2$ ;  $t = 2.3$ ,  $p = 0.023$ ,  $R^2 = 0.4$ ); depression (PASS:  $B = 0.1$ ;  $t = 5.7$ ,  $p < 0.001$ ; NuPDQ:  $B = 0.2$ ;  $t = 2.3$ ,  $p = 0.001$ ,  $R^2 = 0.5$ ); sensitivity (PASS:  $B = 0.2$ ;  $t = 6.1$ ,  $p = 0.022$ ;  $R^2 = 0.5$ ); paranoid ideation (PASS:  $B = 0.1$ ;  $t = 5.2$ ,  $p < 0.001$ ;  $R^2 = 0.4$ ) and psychoticism (PASS:  $B = 0.2$ ;  $t = 5.5$ ,  $p < 0.001$ ; NuPDQ:  $B = 0.2$ ;  $t = 2.6$ ,  $p = 0.017$ ,  $R^2 = 0.5$ ). **Conclusions:** Women with stress or anxiety during their pregnancy are at a greater risk of developing psychopathological symptoms than those who do not report this condition.

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## Teenage mothers’ reflections on the benefits of the salutogenic Childbirth Education Programme: A process evaluation

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### A B S T R A C T

**Introduction:** While motherhood is generally expected to be a joyful event, it also presents numerous stressors. Effectively managing these stressors can make a significant difference in achieving psychosocial well-being. Therefore, identifying strategies that help ease stress during the transition to motherhood is a crucial research question. The aim of this study was to explore participants’ reflections on the benefits of a salutogenic childbirth education programme compared to the usual intervention programme. **Methods:** A qualitative process evaluation was conducted between May 15 and June 20, 2025, in Ethiopia. Fifteen teenage mothers who received salutogenic childbirth education sessions were purposively selected. A reflective thematic analysis was employed to analyse the transcripts. **Results:** Participants described their involvement in the salutogenic childbirth education programme as facilitating a profound shift from fear and anxiety to a sense of stability and empowerment throughout the childbirth process and transition to motherhood. Many participants reported that the programme helped them develop informed strategies to cope with the potential stressors associated with becoming a mother during adolescence. The programme equipped teenage mothers with strategies to navigate challenges by strengthening their intrinsic coping capacities and by leveraging external resources such as social support, thereby fostering emotional resilience and a sense of coherence. **Conclusions:** The salutogenic childbirth education programme was found to enhance the emotional resilience of teenage mothers, thereby supporting psychosocial well-being and reducing the risk of depression during the transition to motherhood.

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## For a good start in life: Systematic peripartum screening and counselling for parents with depression and psychosocial stress

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### A B S T R A C T

**Background:** Peripartum depression affects at least 10-15% of mothers and 5% of fathers, while at least 30% of parents experience psychosocial stress. If untreated, these conditions can have long-term negative effects on family health. In Germany, systematic early detection programmes are lacking. The UplusE study aims to establish systematic screening for depression and psychosocial stress in gynaecological and paediatric practices. The Baby Guides project, on the other hand, screens for the same factors in the antenatal clinic and in the maternity ward of the Department of Obstetrics of the University Hospital of Würzburg. The main outcome of the UplusE project is an increased utilisation of services when screening results are communicated directly. This will also be compared with the follow-up outcomes with regards to support service utilization within the Baby Guides project. **Methods:** The UplusE project is a prospective, cluster-randomised controlled study that implements the screening app in an outpatient setting. The screening tools are the Edinburgh Postnatal Depression Scale (EPDS), KID-Protex reference sheet for psychosocial impairment, and Postpartum Bonding Questionnaire (PBQ). Participants are then referred to appropriate support services through information in the app or the gynaecologists' and paediatricians' practices. The baby guides identify stressors through paper-based screening questionnaires (EPDS, Luitpold) and direct discussions in maternity wards and then refer the families to needs-based support services. **Results:** The UplusE project started German-wide recruitment in February 2024. The intervention phase will run until April 2026. So far, almost  $N = 13,000$  participants have been enrolled. Approximately 25% of screened mothers and about 15% of screened fathers show elevated depressive symptoms within 5 months after birth of a child, and about 23% of the mothers and even up to 43% of fathers with elevated depressive symptoms have difficulties in bonding with their child. About 52% mothers and 44% fathers show at least one psychosocial risk factor. Significantly more parents, who discussed their screening results with their pediatrician were seeking for support compared to those who did not have an initial discussion of the results. Since the start of the Baby Guides project (03/2022), around 72% of women have been screened (of the mothers with about 2000 births a year), with 17% showing an increased need for support. Common stressors include mental illness, social/economic problems and family conflicts. Referrals are mainly made to midwives, psychiatric services and family support services. Initial evaluations show high satisfaction among hospital staff and network partners. **Conclusions:** The first data of two screening projects of pregnant women and young parents verify a high demand, good acceptance and initial indications of a higher utilisation of support services when screened and supported in seeking out to the appropriate help systems.

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## Developing a multinational methodological framework for a scoping review protocol: The WG4.3 experience in the TREASURE COST action

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### A B S T R A C T

**Background:** Within the TREASURE COST Action, Working Group 4 examines how perinatal factors influence infant development. Subgroup 3, focusing on methods to assess the parent-infant relationship, identified the need for a shared methodological approach to support the development of a scoping review protocol mapping assessment instruments for the first 24 months of life. **Methods:** A multinational, consensus-based workflow was implemented across TREASURE member countries. Experts from nursing, midwifery, psychology, psychiatry, paediatrics and developmental science met iteratively to refine conceptual definitions, standardise eligibility criteria and harmonise procedures using the Joanna Briggs Institute framework. A librarian supported the search strategy, and pilot screening helped calibrate reviewer decisions. **Results:** The collaborative process resulted in a structured, stepwise methodological framework, including harmonised conceptual boundaries, consensus-based eligibility criteria and aligned screening and data extraction procedures. **Conclusions:** The WG4.3 experience demonstrates how coordinated, transdisciplinary collaboration enhances methodological coherence in evidence synthesis and strengthens TREASURE's capacity to produce rigorous and comparable research outputs.

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# Protocol for a scoping review on instruments assessing the parent–infant relationship

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## A B S T R A C T

**Background:** The parent–infant relationship in the first 24 months is a multidimensional construct encompassing emotional, behavioural and cognitive exchanges. Instruments assessing bonding, interaction, attachment-related behaviours and parental sensitivity exist, but evidence has not yet been systematically mapped for this developmental period. This review aims to identify and comprehensively map instruments used to assess the parent–infant relationship during the first 24 months. **Methods:** Following the Joanna Briggs Institute methodology and the Population–Concept–Context framework, this scoping review will apply a structured, multi-step search strategy across biomedical, psychological, nursing and educational databases, complemented by grey literature. Two reviewers will independently screen studies and extract data using piloted forms. The international team includes researchers from several TREASURE COST Action member countries. **Results:** The review will generate an integrated mapping of available instruments, including targeted relational dimensions, psychometric properties and contextual applicability. **Conclusions:** This protocol supports a coherent methodological approach to mapping parent–infant relationship assessment and aligns with TREASURE’s aims in early relational health research.

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# Evidence-based psychosocial interventions for partners and families during the perinatal period: A systematic review

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## A B S T R A C T

**Background:** The perinatal period is a demanding transition phase, ranging from the beginning of pregnancy to one year postpartum. Research on this period looking solely on mothers is shifting, understanding it as a family-level concern. We aim to synthesize the current evidence of psychosocial interventions designed for partners and families targeting fathers’ stress and other psychological outcomes. **Method:** We present a preregistered systematic review of psychosocial intervention studies, ranging from psychotherapy to self-help, in which the partner is at least partially involved. **Results:** We identified  $n = 3962$  studies up to September 4th, 2025. In the current stage, title and abstract screening are finalized ( $n = 494$ ). By the time of the conference, the full-text screening will be finalized, and an initial synthesis of evidence will be presented. **Conclusions:** The findings aim to inform the development of a structured toolkit to support partners and families during this critical life phase.

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# Prebiotics, probiotics, and synbiotics and maternal mental health during pregnancy and postpartum period: A systematic review

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## A B S T R A C T

**Background:** To systematically evaluate the efficacy of prebiotics, probiotics, and synbiotics targeting the gut microbiota for preventing mental health disorders during pregnancy and postpartum. **Methods:** The protocol was registered in PROSPERO (CRD42024576678). A comprehensive search across major databases from inception to March 2025 included randomized controlled trials in pregnant or postpartum women assessing these interventions on mental health outcomes. Risk of bias was evaluated with RoB 2. **Results:** Of 1,401 records, four ( $n = 1,342$ ) met the inclusion criteria; all examined probiotics. Two reported small significant reductions in depressive and anxiety symptoms during pregnancy with *Lactocaseibacillus rhamnosus* HN001 or *Limosilactobacillus reuteri* PBS072 plus *Bifidobacterium breve* BB077, which also reduced postpartum depressive scores. Risk of bias was moderate in three trials and high in one. **Conclusions:** Evidence for probiotics in preventing perinatal mental health disorders remains limited, and further high-quality studies on prebiotics, synbiotics, and strain-specific effects are required for implementation.

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# The association between paternal perinatal stressors and offspring neurodevelopmental and mental health outcomes: A systematic review

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## A B S T R A C T

**Background:** Paternal perinatal stress is an important yet understudied factor that may influence offspring neurodevelopmental and mental health trajectories. While maternal perinatal stress has been widely examined, the impact of fathers' stress during pregnancy and the first year postpartum remains unclear. **Methods:** Following PRISMA guidelines, this systematic review will include quantitative observational and interventional studies assessing fathers ( $\geq 18$  years) during pregnancy to 12 months postpartum. Eligible studies must measure perinatal stressors using physiological or psychological indicators and report offspring neurodevelopmental or mental health outcomes across the lifespan. Searches will be conducted in PsycINFO, PubMed, and Web of Science with no language or date restrictions. Screening, data extraction, and risk of bias assessment will be performed independently by at least two reviewers using established appraisal tools. A qualitative synthesis will summarise associations. **Results:** Data extraction and synthesis are ongoing. **Conclusions:** Findings will clarify paternal perinatal stress-related risks, identify knowledge gaps, and inform future interventions supporting paternal and child wellbeing.

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# Adverse birth experiences and association with maternal stress and post-traumatic stress disorder

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## A B S T R A C T

**Background:** Adverse experiences during childbirth have been linked to emotional problems in the postpartum period. This study aimed to identify profiles of negative childbirth experiences and their relationship with emotional disturbances during postpartum. **Methods:** A total of 243 Spanish women participated (M = 33.31 years). Sociodemographic data were collected, and scales assessing prenatal bonding, birth satisfaction, obstetric violence, post-traumatic stress disorder (PTSD) symptoms, and maternal stress were administered. A k-means cluster analysis was conducted using the first three scales, resulting in two groups: normative (91.4%) and at-risk (8.6%). An ANCOVA was then performed to compare stress and PTSD between the two groups. **Results:** The at-risk group exhibited significantly higher scores in PTSD, personal needs, and fatigue. The covariate hospital was found to influence PTSD levels. **Conclusions:** Experiencing adversities during childbirth increases the likelihood of PTSD symptoms and greater fatigue in the postpartum period, underscoring the need to prevent such experiences.

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## Prenatal stress during pregnancy and neuropsychological development in mother–infant dyads: A systematic review and meta-analysis

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### A B S T R A C T

**Introduction:** Prenatal maternal stress (PMS) influences maternal mental health and neuropsychological development in the offspring. Dysregulation of neuroendocrine, inflammatory and cognitive-emotional systems may shape early cognitive, emotional and behavioural trajectories. This systematic review and meta-analysis examines how PMS affects neuropsychological functioning in maternal–infant dyads. **Methods:** A systematic search was conducted in PubMed, Scopus, Web of Science and PsycINFO without year or language limits. Eligible studies assessed PMS during pregnancy and neuropsychological outcomes in mothers and/or offspring. Study quality was evaluated, and outcomes were classified into cognitive, emotional, behavioural and physiological domains. **Results:** Preliminary analyses show consistent associations between higher PMS levels and alterations in maternal emotional functioning, infant emotional regulation, early cognitive development and stress reactivity. Evidence from biomarkers, psychological measures and developmental assessments supports these patterns. **Conclusions:** PMS produces measurable neuropsychological effects in the maternal–infant dyad. Integrating biological and psychological evidence is essential to improve prevention, early detection and targeted interventions.

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## Potentially traumatic lifetime experiences and maternal-fetal bonding difficulties: The mediating role of prenatal mental health problems

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### A B S T R A C T

**Introduction:** Potentially traumatic lifetime experiences can negatively affect maternal-fetal bonding. However, the underlying mechanisms remain poorly understood. This study analyzed the association between potentially traumatic lifetime experiences and maternal-fetal bonding difficulties, considering the mediating role of prenatal mental health problems (anxiety, depression, and post-traumatic stress disorder [PTSD] symptoms). **Methods:** At the third trimester of pregnancy, 494 expectant mothers completed a sociodemographic questionnaire and self-reported measures. Regression and mediation analyses were conducted. **Results:** Potentially traumatic lifetime experiences were not directly associated with maternal-fetal bonding difficulties. However, an indirect association was found through prenatal anxiety symptoms. Prenatal depression and PTSD symptoms were not significant mediators. **Conclusions:** Results indicated that prenatal anxiety symptoms mediated the association between potentially traumatic lifetime experiences and maternal-fetal bonding difficulties. This underscores the importance of integrating trauma and mental health screening into prenatal care to identify expectant mothers at risk of bonding difficulties.

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## Prenatal exposure to maternal stress during floods (Valencia, Spain, 2024) and birth outcomes

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### A B S T R A C T

**Background:** Pregnancy is a period of heightened susceptibility to external insults. In October 2024, an unprecedented torrential rain (DANA) struck southeast Spain. Concentrated in just a few hours and specific areas, it triggered severe flooding that caused over 220 casualties and extensive property damage --the most devastating natural disaster in Europe so far in the 21st century. **Methods:** Using a difference-in-differences framework and administrative microdata on post-disaster births, in this original study we analyse whether pregnant mothers who were exposed to the DANA were more likely than those unexposed to deliver babies with poorer health outcomes. We analyse dose-response patterns and heterogeneity by maternal socioeconomic status. Focusing on three indicators of perinatal health that capture key social and physiological mechanisms, particularly stress. **Results:** We find that babies exposed in utero experienced significantly worse outcomes. **Conclusions:** These results provide new evidence of the intergenerational consequences of maternal stress triggered by acute natural disasters.

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# Understanding childbirth experience as a potential perinatal stressor: Protocol of the EXPAR-P longitudinal study

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## ABSTRACT

**Background:** Childbirth experience represents a potential source of stress that may influence parental mental health, bonding, and early caregiving. Longitudinal studies integrating psychological, social, and obstetric factors remain limited. This protocol outlines the EXPAR-P Project, a three-wave study examining how childbirth experience shapes parental adjustment. **Methods:** Participants will be assessed during pregnancy, at 4–6 weeks postpartum, and at 6 months postpartum. Measures include childbirth experience, birth trauma, perinatal depression, parental bonding, parenting self-efficacy, adult attachment, personality traits, social support, and obstetric variables. A new Spanish childbirth experience questionnaire will be developed. Planned analyses comprise longitudinal modelling, mediation, and moderation. **Results:** Expected findings include robust psychometric evidence for the new instrument, predictive associations between childbirth experience and parental mental health, and mediating/moderating roles of self-efficacy, bonding, and social support. **Conclusions:** This study will advance understanding of perinatal stress processes and guide preventive strategies to support parental mental health and parenting.

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## A systematic review of the association between psychological and biological indicators of maternal prenatal stress and newborn outcomes: Preliminary findings

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## ABSTRACT

**Background:** Maternal stress is a key adverse factor that alters the intrauterine environment, affecting pregnancy outcomes, fetal development, and neonatal health. **Methods:** This ongoing systematic review, conducted in accordance with the PRISMA guidelines, aims to synthesize the evidence on the association between maternal prenatal stress, measured by psychometric scales and biological markers, and newborn outcomes within the first 28 days of life. Specifically, it examines the predictive role of psychological and biological indicators on birth (e.g., birthweight) and neonatal (e.g., Apgar score) outcomes, and whether these measures demonstrate convergent effects. **Results:** Searches were conducted in PubMed, Web of Science, Scopus and PsycINFO, yielding 18,057 articles. The authors are currently resolving duplicates ( $n = 9,873$ ) and will then proceed to 12,117 title and abstract screening, data extraction and study quality assessment. **Conclusions:** The findings may help identify relevant indicators of prenatal stress and guide effective early interventions, promoting improved perinatal development and long-term health.

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## Dimensions of perinatal affective symptoms: Item-level modeling of the Edinburgh Postnatal Depression Scale and State Anxiety Inventory

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### A B S T R A C T

**Background:** Depressive and anxiety symptoms are common in the perinatal period and are typically assessed with the EPDS and STA-S. Both instruments show overlapping item content raising questions about their dimensional structure. **Methods:** This study examined the joint item-level structure of EPDS and STAI-S items, tested measurement invariance, reliability, and predictive validity with mother–infant bonding difficulties. A sample of 690 perinatal women completed the EPDS and STAI-S. Factor analyses were conducted. Measurement invariance was examined across perinatal period, sociodemographic, obstetric, and clinical subgroups. A subsample completed mother–infant bonding. **Results:** A three-factor solution (General Distress, Anxiety and Depressive Symptoms) showed good fit and was invariant across subgroups. Good reliability and predictive validity were found, with higher General Distress and Depressive Symptoms predicting greater bonding difficulties. **Conclusions:** These findings indicate that EPDS and STAI-S items reflect a tripartite structure aligned with dimensional models of internalizing distress, providing a refined basis for assessing perinatal affective symptoms.

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## Profiles of perinatal affective symptoms: A person-centered analysis from pregnancy to the postpartum period

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### A B S T R A C T

**Background:** Depressive and anxiety symptoms are highly prevalent during the perinatal period and contribute to poorer maternal outcomes. This study aimed to: (1) identify profiles of perinatal affective symptoms at the third trimester of pregnancy (T1), 2- (T2), and 6-months postpartum (T3); (2) examine profile transitions from T1 until T3. **Methods:** 164 Portuguese women were recruited at T1 and enrolled in T2 and T3. Sociodemographic, obstetric, and mental-health characteristics were collected. Participants completed EPDS and STAI-S at all time-points. Latent profile and transition analyses were conducted. **Results:** Three profiles reflecting symptom severity were identified at each time point: High (T1: 22.0%; T2,T3: 16.5%), Moderate (T1: 47.6%; T2: 48.8%; T3: 54.3%), and Low (T1: 30.5%; T2: 34.8%; T3: 29.3%). These profiles showed high transition stability from T1 to T3. **Conclusions:** The identification of stable symptom profiles highlights the relevance of person-centered approaches to perinatal mental health assessment.

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## From the womb into the world: How maternal stress and the physical environment shape newborn epigenetics

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### A B S T R A C T

**Background:** Maternal stress and environmental exposures, like PM2.5 and green spaces, can influence infant development through epigenetic mechanisms. However, how these factors interact to affect newborn DNA methylation (DNAm) remains unclear. **Methods:** Mother–infant dyads ( $N = 307$ ) were enrolled at delivery. Buccal samples were analyzed for SLC6A4 and BDNF DNAm. Maternal stress was retrospectively reported. PM2.5 exposure was estimated via CAMS data; green space availability was calculated using CLCplus 2021. Hierarchical regressions tested independent and interactive effects of exposures. **Results:** Higher prenatal stress was associated with increased SLC6A4 DNAm in newborns prenatally exposed to higher levels of PM2.5. Maternal trait anxiety was linked to increased BDNF DNAm only among infants with lower green space exposure. **Conclusions:** Prenatal stress and physical environments jointly shape epigenetic outcomes. Understanding these interactions has important implications for maternal–infant health, emphasizing the need for policies promoting clean air and access to green spaces since pregnancy.

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# Psychometric properties of instruments for assessing perinatal maternal stress associated with offspring outcomes: A systematic review

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## A B S T R A C T

**Background:** Maternal perinatal stress is associated with offspring neurodevelopmental and mental health outcomes. Yet instruments used to assess this stress differ widely in scope, quality, and psychometric robustness, limiting comparability across studies and clinical practice. A systematic evaluation is needed to identify reliable measures and guide evidence-based research. **Methods:** This two-stage review identifies self-report, clinician-rated, and cognitive-behavioral measures of perinatal maternal stress during pregnancy or the first postpartum year associated with child outcomes beyond age three, then evaluates psychometric properties using established criteria. Searches in PsycINFO, Web of Science, Scopus, and PubMed (2015–2025) yielded 26,726 records. Independent reviewers have commenced screening. Prospective Register of Systematic Reviews (PROSPERO) registration pending author approval. **Results:** Eligible instruments are being identified; psychometric evaluation will follow. **Conclusions:** Within Action CA22114, this review will synthesise psychometric evidence, highlight strengths and gaps, and inform evidence-based approaches to assessing perinatal maternal stress in international research and clinical practice.

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# Feasibility and acceptability of non-invasive psychobiological and behavioural measures of stress and parent–infant synchrony in NICU infants, mothers, and fathers: A rapid scoping review

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## A B S T R A C T

**Background:** Families in the Neonatal Intensive Care Unit (NICU) experience stress and connection challenges. Studies using non-invasive psychobiological and behavioural measures, applied within a triadic framework (infant, mother/father, dyad), explored stress, emotion regulation, and parent–infant synchrony. Their feasibility and acceptability in sensitive NICU contexts remain unclear. **Methods:** This review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), pending registration on the Open Science Framework (OSF). Peer-reviewed studies published in English between 2010 and 2025 will be identified through Web of Science, Scopus, and PsycINFO. Eligible measures are defined as non-invasive techniques with minimal disruption to infant or parent wellbeing, bonding, and routine care. They will be synthesised across psychobiological, behavioural, neuroimaging, and psychosocial categories. **Results:** Data extraction planned; results forthcoming. **Conclusions:** The review maps feasible, acceptable non-invasive measures in a triadic framework to inform ethical, family-centred research, clinical practice, and policy.

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# Prenatal maternal stress and early neurodevelopment: A narrative review of biological pathways and EEG/neuroimaging markers

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## ABSTRACT

**Background:** Prenatal maternal stress has been linked to altered fetal brain development and later emotional and cognitive problems through complex biological and neurophysiological pathways. **Methods:** We narratively reviewed human and animal studies from the last 15 years that examined biological mediators and EEG/neuroimaging markers in offspring exposed to maternal stress during pregnancy. **Results:** Higher prenatal stress, anxiety or depression were associated with elevated cortisol, pro-inflammatory cytokines, altered placental function and epigenetic changes in stress-related genes. These pathways were linked to differences in gestational age, infant temperament and early emotional regulation. EEG and neuroimaging studies reported altered power spectra, functional connectivity and structural changes in frontolimbic and default-mode networks in exposed children, consistent with these biological vulnerabilities. **Conclusions:** Prenatal maternal stress is a modifiable risk factor for offspring mental health. Integrating biological markers with EEG-based measures in longitudinal design may improve early risk detection and targeted prevention.

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# Assessment of tokophobia in the perinatal period: Findings from an international multicountry study

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## ABSTRACT

**Background:** Tokophobia measures fear of childbirth, which is one component of psychological distress in the perinatal period. Tokophobia Severity Scale (TSS) is one of the few self-reported measures available to assess tokophobia symptoms. **Aims and objectives:** TSS ability to assess tokophobia in women in the perinatal period using data from three countries: Australia, Lithuania, and Portugal. **Methods:** The sample included 1,026 participants, who were either pregnant or two months postpartum. Participants completed the TSS, and self-reported questionnaires on sociodemographic, obstetric, fetal/neonatal, mental health-related characteristics, depressive and anxiety symptoms, and birth trauma perception. **Results:** Higher TSS scores during pregnancy predicted elective cesarean section, higher birth trauma perception, and postpartum depressive and anxiety symptoms. The TSS has screening ability to distinguish between women with and without clinically significant tokophobia symptoms in perinatal period and countries. **Conclusions:** Integrating TSS into perinatal screening protocols would allow for the proactive early identification of tokophobia, and grant effective referring to personalized specialized healthcare. Therefore, it could contribute to the effectiveness in the promotion of women's mental health during pregnancy and the postpartum period.

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# Maternal mental health in perinatal period and infant temperament

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## A B S T R A C T

**Background:** To investigate the association between prenatal and postnatal maternal anxiety and/or depressive symptoms and infant temperament. **Methods:** 161 pregnant women and 328 women at six months postpartum completed the STAI-S, EPDS and IBQ. **Results:** Infants of mothers with (vs. without) clinically significant anxiety and/or depressive symptoms (EPDS  $\geq$  13; STAI  $\geq$  45) during pregnancy showed higher activity level ( $M = 4.18$  vs. 3.18), distress to limitations ( $M = 4.75$  vs. 3.96), sadness ( $M = 4.22$  vs. 3.53). Infants of mothers with (vs. without) clinically significant symptoms in the postpartum showed higher activity level ( $M = 4.00$  vs. 3.28), distress to limitations ( $M = 4.51$  vs. 4.03), lower falling reactivity ( $M = 5.01$  vs. 5.29), soothability ( $M = 5.11$  vs. 5.54), and cuddliness ( $M = 5.39$  vs. 5.79) (all  $ps < .05$ ). **Conclusion:** Maternal mental health problems during the perinatal period are associated with more difficult infant temperament in dimensions related to negative affectivity, orienting/regulation, and extraversion/surgency.

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# Toward an evidence- and consensus-based definition of maternal peripartum stress

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## A B S T R A C T

**Background:** Women may experience elevated stress during the peripartum period, with possible adverse effects on mothers and infants. Yet, no consensus exists on how to conceptualise maternal peripartum stress. Mapping existing conceptualisations could support the development of a comprehensive definition, subsequently improving the comparability across future studies. **Methods:** A scoping review was conducted to synthesise the current knowledge on maternal peripartum stress. Key concepts extracted from the literature informed a draft definition, which was refined through a four-round Delphi process involving more than 500 members of the TREASURE network. **Results:** This process produced a clear, evidence- and consensus-based definition of maternal peripartum stress, which will be presented at the conference. **Conclusions:** The resulting definition marks an important step toward a shared understanding of maternal peripartum stress, supporting more targeted research and informing evidence-based clinical practice to improve perinatal care for women and infants.

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## Breast cancer diagnosed during pregnancy: Perinatal stress, treatment challenges, and infant outcomes among affected mothers

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### A B S T R A C T

**Background:** A cancer diagnosis during pregnancy represents a rare and highly stressful intersection of maternal vulnerability and medical complexity. This study examines emotional responses, treatment trajectories, and infant outcomes among women diagnosed with breast cancer during pregnancy. **Methods:** Six mothers completed a structured questionnaire assessing diagnosis timing, emotional reactions, coping mechanisms, treatment continuation, perinatal stress, delivery mode, and child outcomes. **Results:** All women were diagnosed with breast cancer; 67% in the first trimester and 33% in the second. Shock and fear were reported by 67%, while 33% described acceptance or hope. Stress levels ranged from 3 to 10. During pregnancy, 67% received full treatment, 17% partial, and 17% none. Caesarean delivery occurred in 83%. At birth, 67% of infants were in good condition, and all children (100%) currently show normal development. Psychological support was needed by 67% but rarely accessed. **Conclusions:** Breast cancer in pregnancy imposes significant emotional and medical burdens, yet infant outcomes appear largely favorable, underscoring the need for integrated perinatal-oncology mental-health care.

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## Mitigating psychological birth trauma: Guidelines for culturally competent communication with foreign women

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### A B S T R A C T

**Background:** Despite ongoing conceptual debate, psychological birth trauma refers to overwhelming distressing experiences during childbirth with negative impacts on women's lives. Risk factors for traumatic childbirth include non-European status and low social support, frequently faced by foreign women in the EU. Inadequate communication between women and healthcare personnel is a primary cause, exacerbating risks for immigrant women. **Methods:** To address this, we developed communication guidelines for medical staff interacting with foreign women pre-, during, and post-childbirth. **Results:** These guidelines leverage our center's practice, where under 1% of 300 births resulted in PBT, and scientific evidence for trauma reduction. **Conclusions:** We propose practical solutions centered on intercultural mediation and staff education to cultivate intercultural competencies, thereby fostering appropriate communication and mitigating PBT for this vulnerable population.

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## Pregnancy following wartime child loss: Perinatal stress and early mother-infant bonding in bereaved mothers

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### A B S T R A C T

**Background:** Maternal perinatal stress after losing a child during armed conflict represents a unique form of traumatic bereavement. This study focuses on mothers who conceived following the loss of sons in the Nagorno-Karabakh (Artsakh) war, examining their emotional and perinatal experiences. **Methods:** Eighteen bereaved mothers completed a structured survey assessing conception type, emotional responses, psychological support, pregnancy complications, delivery mode, and infant outcomes. **Results:** Natural conception occurred in 62.5%, assisted reproduction in 37.5%. Only 37.5% had prior psychological support, while 50% reported needing it during pregnancy. Emotional tension was high (5–10). Guilt, anxiety, or mixed emotions were reported by 87.5%. Pregnancy complications occurred in 75%, and 75% delivered via caesarean section. At birth, 62.5% of infants were in good condition; approximately 70% were considered healthy overall. All mothers described a very strong bond with their newborns. **Conclusions:** Pregnancy after wartime bereavement involves substantial emotional strain and profound meaning-making, underscoring the need for tailored perinatal mental-health care.

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# Trajectories of parental bonding difficulties in the first two years postpartum: A growth mixture modeling approach

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## A B S T R A C T

**Background:** Parental bonding is central to child development and parental well-being, yet its developmental course remains insufficiently understood. This study examines parental bonding difficulty trajectories during the first two years postpartum. **Methods:** Data came from the longitudinal DREAM cohort (mothers:  $n = 1,761$ ; fathers:  $n = 1,128$ ). Bonding difficulties were assessed at 8 weeks, 14 months, and 24 months postpartum. Growth Mixture Modeling was used to identify trajectory classes, followed by multinomial logistic regression to identify predictors of class membership. **Results:** Three trajectories emerged for both parents: “low-steady”, “recovering”, and “aggravating”. The latter two showed clinically relevant, decreasing and increasing bonding difficulties, respectively. Predictors included subjective birth experience and child temperament, next to anger/hostility (only mothers), first-time parenthood and age (only fathers). **Conclusions:** Bonding is not a uniformly stable process. Identifying heterogeneous trajectories and their predictors may guide early detection and targeted intervention strategies, aiding understanding of parental perinatal stressors.

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# Healthy adaptation to pregnancy, postpartum and parenthood (HAP3): Study protocol of the feasibility study of the HAP3 family app and dashboard for weight and mental health management in women, partners, and offspring during pregnancy and postpartum

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## A B S T R A C T

**Background:** Mental health challenges and obesity during the perinatal period are highly prevalent and interrelated, contributing to maternal perinatal stress and long-term consequences for parents and children. Digital app interventions that simultaneously address mental health and weight in routine care are scarce. HAP3 will evaluate the feasibility of an app intervention supporting self-monitoring and self-management for parents during pregnancy and postpartum. **Methods:** This multi-country, feasibility randomized controlled trial (RCT) targets 564 pregnant women and partners. The Intervention group will receive the HAP3 Family App. Participants will be assessed via questionnaires and Ecological Momentary Assessments. The control group will receive treatment-as-usual. **Results:** We will present the design of the RCT, detailing the HAP3 intervention, planned feasibility outcomes, and exploratory secondary outcomes on parental mental health, weight, and early child development. **Conclusion:** The study will evaluate the feasibility of the HAP3 Family App and lay the groundwork for a future full-scale trial.

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# Association between obesity and mental health during the transition to parenthood in mothers and partners: A systematic review

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## A B S T R A C T

**Background:** The transition to parenthood is a critical period marked by changes that can affect physical and mental health in mothers and partners. Parental obesity and mental health problems are common during this period and may be intertwined. Despite their relevance for perinatal stress and child developmental outcomes, these factors are rarely examined together. **Methods:** This systematic review synthesizes evidence on the association between parental overweight/obesity and mental health in mothers and partners from pregnancy to two years postpartum. Searches were conducted in CINAHL, Embase, MEDLINE, PsycInfo, and Scopus. Screening is performed by two reviewers in Rayyan and supported by ASReview. **Results:** The initial search identified 19,111 records. After deduplication, 12,097 remained. Preliminary findings from the ongoing screening phase will be discussed. **Conclusion:** Understanding these associations is essential for improving screening approaches to perinatal stress and informing multimodal prevention and intervention supporting parental well-being, healthy weight, and child outcomes.

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# Moral injury in mothers and maternity care providers: Implications for perinatal stress and early development

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## A B S T R A C T

**Background:** Moral injury which is defined as a type of psychological distress following perceived violations of one's core moral beliefs is increasingly recognized in perinatal settings. Evidence shows that moral injury in women is associated with adverse pregnancy outcomes beyond the effects of trauma and PTSD, indicating unique pathways shaping perinatal health (Nilni et al., 2020). Simultaneously, maternity care professionals experience moral distress and moral injury when witnessing traumatic births or being constrained from acting according to their values, with consequences for empathy, clinical decision-making, and quality of care (Kendall-Tackett & Beck, 2022; Rost et al., 2024). **Methods:** This narrative review synthesizes empirical and conceptual findings across maternal trauma, moral injury, and maternity care literature, supplemented by expert clinical reflections. **Results:** Across mothers and providers, moral injury manifests through guilt, betrayal, powerlessness, and value conflict, contributing to heightened perinatal stress, defensive care practices, and risk of traumatic birth experiences. **Conclusions:** Addressing moral injury as an interconnected maternal-provider phenomenon may improve perinatal wellbeing and support healthier early developmental environments.

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# Longitudinal effects of maternal stress induced by childbirth on mother-child bonding and children's emotional-behavioral development in two cohort-studies

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## A B S T R A C T

**Background:** Negative experiences during childbirth can cause stress, affecting mother-child bonding and potentially impacting emotional-behavioral development in the long term. This study examined these longitudinal associations and the mediating role of bonding across two cohort studies of preschool children. **Methods:** Data on birth experience, mother-child bonding (Postpartum Bonding Questionnaire; Attachment Scale of the Parenting Stress Index), and child emotional-behavioral problems (Strengths and Difficulties Questionnaire) were collected from  $N = 1,608$  mothers (DREAM, Germany) and  $N = 1,783$  mothers (Generations2, Netherlands). Direct and indirect effects were analysed using structural equation modelling. **Results:** In both cohorts, a negative birth experience predicted poorer bonding, which was associated with children's emotional-behavioral problems. Only in DREAM, small mediating effects of bonding on the association between birth experience and externalizing problems were observed. **Conclusions:** Findings suggest that negative birth experiences are a relevant stressor for mother-child bonding, but only affect emotional-behavioral development through bonding.

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# Differential associations between general and childbirth-related PTSD symptoms and mother-infant bonding: A systematic review and meta-analysis elucidating intergenerational transmission pathways

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## A B S T R A C T

**Background:** Maternal perinatal posttraumatic stress disorder (PTSD) symptoms have been associated with impaired mother-infant bonding (MIB), a potential pathway for intergenerational stress transmission. However, the differential impact of general PTSD (gPTSD; unrelated to childbirth) and childbirth-related PTSD (CB-PTSD) on MIB remains insufficiently clarified. Distinguishing between these stress subtypes may enhance understanding of intergenerational transmission mechanisms and improve perinatal stress assessment approaches. **Methods:** This systematic review and meta-analysis was conducted in accordance with PRISMA guidelines. Comprehensive literature searches were performed to identify studies examining associations between perinatal PTSD symptoms and MIB. Random-effects models were applied to estimate pooled effect sizes. Subgroup analyses differentiated between gPTSD and CB-PTSD, and within CB-PTSD, between general and birth-specific symptom clusters. **Results:** The systematic review included 22 studies ( $N = 9,472$ ), demonstrating positive associations between perinatal PTSD symptoms and impaired MIB. Depression was identified as a potential confounding factor in several studies. Meta-analytic findings indicated small-to-moderate associations for gPTSD ( $r = .32$ ;  $k = 8$ ) and moderate associations for CB-PTSD ( $r = .38$ ;  $k = 15$ ). Within CB-PTSD, general symptom clusters (e.g., hypervigilance) showed stronger associations with impaired bonding compared to birth-specific symptoms (e.g., re-experiencing;  $k = 5$ ). **Conclusions:** Findings suggest differential associations between gPTSD and CB-PTSD in relation to mother-infant bonding, highlighting symptom-specific mechanisms potentially underlying intergenerational stress transmission pathways. These results inform targeted intervention strategies and refinement of perinatal stress assessment tools.

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## Assessment of fear of birth in the perinatal period: Findings from multicountry study

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### ABSTRACT

**Background:** To evaluate the psychometric properties of Fear of Birth Scale (FOBS) in the perinatal period in Australia, Germany, Lithuania, Poland, and Portugal. **Methods:** Women ( $n = 3,431$ ) completed sociodemographic and health data and the FOBS during pregnancy or postpartum. Type of birth, depressive and anxiety symptoms were reported by a subsample in the postpartum. **Results:** The optimal balance between sensitivity and specificity varied at cut-off scores of 44 to 45 (pregnancy) and 35.75 to 49.75 (postpartum) depending on the country, at which 74.5 % to 81.4 % of women are correctly identified as having FOC. Higher FOBS scores during pregnancy were associated with higher anxiety, ( $\beta = 0.46, p < .001$ ) and depressive symptom severity in postpartum ( $\beta = 0.24, p < .001$ ), and higher odds of cesarean section, OR = 1.02. **Conclusions:** Integrating FOBS into perinatal mental health screening may enhance early detection of fear of childbirth, facilitating timely support.

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## The moderating role of previous mental health problems in the association between partner support during childbirth and postpartum mental health outcomes

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### ABSTRACT

**Background:** This study examined the moderating role of previous mental health (MH) diagnosis in the association between partner support during childbirth and depressive, anxiety, and childbirth-related posttraumatic stress disorder (CB-PTSD) symptoms. **Methods:** At two months postpartum, women ( $n = 284$ ) reported sociodemographic, obstetric, and MH-related data, partner support during childbirth, and depressive (EPDS), anxiety (STAI-S), and CB-PTSD (CityBits) symptoms. **Results:** Previous diagnosis of MH problems moderated associations between partner support and depressive ( $\beta = 0.89, p = .037$ ) and anxiety symptoms ( $\beta = 2.28, p = .02$ ). Conditional analyses indicated that partner support was protective only for women without prior MH diagnosis: depressive ( $\beta = -1.37, p = .01$ ) and anxiety ( $\beta = -3.26, p = .01$ ) symptoms, whereas for women with a prior diagnosis, partner support was not associated with symptom severity. **Conclusions:** Women with a history of MH problems may require additional support beyond partner support to prevent or reduce postpartum MH difficulties.

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# Psychometric properties of the Portuguese Prenatal Parental Reflective Functioning Questionnaire in expectant mothers

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## A B S T R A C T

**Background:** Analyze Prenatal Parental Reflective Functioning questionnaire (P-PRFQ) scores as a predictor of mother-infant bonding difficulties (MIBD). **Methods:** Participants ( $n = 389$ ) completed the P-PRFQ and sociodemographic and health data during pregnancy. At two months postpartum, a subsample completed measures on PRF and MIBD. **Results:** Higher P-PRFQ scores ( $\beta = -.17$ ;  $t(162) = -2.09$ ;  $p = .039$ ) and P-PRFQ subscale reflecting on the fetus-child mental states were associated with less MIBD ( $\beta = 1.37$ ;  $t(161) = 2.88$ ;  $p < .001$ ). Higher P-PRFQ subscales scores on opacity of mental states ( $p = .002$ ), reflecting on the fetus-child mental states ( $p = .007$ ), and P-PRFQ total ( $p = .002$ ), predicted more certainty about mental states in the postpartum period. Higher scores in the P-PRFQ total ( $p = .014$ ), and P-PRFQ reflecting on the fetus-child mental states ( $p < .001$ ), and dynamic nature of mental states ( $p = .003$ ), predicted more interest and curiosity about infant mental states in the postpartum period. **Conclusions:** The use of P-PRFQ in healthcare settings may support early detection of MIBD.

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# The interplay between stress response systems and psychosocial factors in association with maternal or partner mental health during the transition to parenthood: A systematic review

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## A B S T R A C T

**Background:** Depression and anxiety symptoms and disorders during the transition to parenthood, defined as pregnancy through two years postpartum, can affect mothers, partners, and children. Although many studies examine biological and psychosocial risk factors, prevention requires understanding their interplay to identify protective factors buffering parental mental health. Stress-response systems are biological pathways linked to psychosocial factors, and both have been associated with parental mental health across this period. **Methods:** This systematic review synthesises evidence on the interplay between parental stress-response systems and psychosocial factors in relation to parental depression and anxiety. **Results:** Across five databases, 1,515 publications met inclusion criteria. Preliminary screening suggests that integrative biopsychosocial analyses remain limited, with most studies focusing on child outcomes rather than parental anxiety or partner mental health. Preliminary outcomes, based on the first phase of the study, will be reported. **Conclusions:** This fragmentation underscores the need to advance an integrated biopsychosocial framework.

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# Clinician's acceptability and feasibility to use markers and assessments for Parental Peripartum Stress (PPS) in daily routine: Development and implementation of a multinational cross-sectional survey

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## ABSTRACT

**Background:** Parental Peripartum Stress (PPS) encompasses physical, emotional, and psychological challenges affecting parents and infants. Clinicians' views on the feasibility and acceptability of multidimensional PPS assessments are essential. This study aims to develop a survey exploring health professionals' knowledge, attitudes, and practices regarding PPS assessment in daily routine care. **Methods:** A multinational cross-sectional study design will be employed, involving licensed clinicians recruited through snowball sampling from the participants' countries. An internationally applicable, culturally sensitive survey will be collaboratively developed by the research team (Treasure WG3 SG5 members) to assess participants' knowledge, attitudes, and practices regarding PPS assessment. Data collection will be conducted through a secure online platform to enhance accessibility and encourage participation across countries. **Results:** The Developing survey and data collection process are ongoing. **Conclusions:** The findings will provide a comprehensive understanding of healthcare professionals' experiences and practices in assessing PPS.

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# Maternal adverse lifetime experiences and infant temperament: The role of prenatal PTSD symptoms

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## ABSTRACT

**Background:** This study analyzed the mediating role of prenatal posttraumatic stress disorder (PTSD) symptoms in the association between maternal adverse lifetime experiences (ALEs) and infant temperament. **Methods:** A sample of 154 mothers reported on ALEs and PTSD symptoms (PCL; hyperarousal, re-experiencing, negative cognitions/affect [NC/A], and avoidance) during pregnancy and on infant temperament (IBQ; negative affectivity, regulation, and surgency/extraversion) at 6 months postpartum. **Results:** More ALEs were associated with higher prenatal PTSD symptoms severity, which in turn were associated with higher negative affectivity (PCL:  $b=0.06$ , 95%CI [0.00,0.17]; NC/A:  $b=0.06$ , 95%CI [0.01,0.16]) and lower regulation (PCL:  $b=-0.05$ , 95%CI [-0.12,-0.00]; NC/A:  $b=-0.04$ , 95%CI [-0.10, -0.00]). **Conclusions:** Prenatal PTSD symptoms are a modifiable pathway linking ALEs to infant emotional and regulatory outcomes, supporting trauma-informed perinatal interventions.

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## The dissociative subtype of Childbirth-related Posttraumatic Stress Disorder: Investigating demographic, mental health, and childbirth-related predictors

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### A B S T R A C T

**Background:** Perinatal maternal stress is a key risk factor for adverse mental health outcomes following childbirth. Childbirth-related PTSD (CB-PTSD) affects ~4.7% of mothers, yet little is known about its dissociative subtype (D-CB-PTSD), characterized by derealization and depersonalization. **Methods:** Using data from the international INTERSECT study across 31 countries, this cross-sectional analysis examines individual and country-level risk factors for D-CB-PTSD and its association with symptom severity within six months. 606 mothers met CB-PTSD criteria assessed with the City Birth Trauma Scale and completed questions regarding demographic, mental health, and childbirth factors. **Results:** In multilevel analyses mothers with D-CB-PTSD (55.8%) were more likely to report interpersonal trauma, a previous mental health diagnosis, and major infant complications, consistent across countries. D-CB-PTSD was associated with greater symptom severity across countries, even after adjusting for postpartum depressive symptoms. **Conclusions:** Findings highlight the global relevance of dissociative symptoms to maternal stress responses after childbirth trauma.

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## The assessment of psychometric properties and construct validity of the Spanish version of the Paternal Antenatal Attachment Scale (PAAS-S)

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### A B S T R A C T

**Background:** This study assesses the psychometric properties and construct validity of the Spanish version of the Paternal Antenatal Attachment Scale (PAAS-S) on 134 men. The scale has shown persistent structural inconsistency across studies, and its construct validity has never been tested against mental-health disorders' measures. **Methods:** An exploratory (EFA) and a confirmative factor analysis (CFA) were performed. Construct validity was tested against depression, anxiety, psychosocial risk, and couple relationship quality. **Results:** A two-factor structure (intensity-IA, and quality-QA) was extracted by EFA and confirmed by CFA (RMSEA = 0.06, CFI = 0.90, SRMR = 0.07). As expected, the QA was negatively associated with depression, anxiety and psychosocial risks; IA with depression and psychosocial risks, but not with anxiety. Couple relationship quality correlated positively. However, QA subscale showed low reliability ( $\alpha = 0.65$ ;  $\omega = 0.55$ ). **Conclusions:** The PAAS-S shows promise for assessing paternal antenatal attachment, despite highlighting persistent psychometric weaknesses consistent with prior literature.

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## Protocol and preliminary finding: The development of the Healthy Adaptation to Pregnancy, Postpartum, and Parenthood (HAP3) Family Application (App)

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### A B S T R A C T

**Background:** Mental health challenges and overweight are among the most common and interrelated complications during pregnancy and postpartum. This study aims to explore user needs to inform the development of a digital intervention to support perinatal wellbeing for women and their partners. **Methods:** The HAP3 app will be developed using a co-creation design. Phase one consists of a needs assessment involving semi-structured interviews with pregnant and postpartum individuals and their partners to explore lived experiences, challenges, and support needs. Phase two involves co-creation workshops to refine and prioritise app features and content. Data will be analysed using thematic analysis. **Results:** Preliminary needs assessment findings will be presented. Findings will highlight participants' experiences, support needs, and perceived barriers, informing the co-creation and development of the app. **Conclusions:** This work will inform the design of a user-centred digital intervention to support perinatal wellbeing and healthy behaviours for parents and parents-to-be.

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## Biological markers of peripartum maternal stress associated with neurodevelopmental and mental health effects in children above 3 years

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### A B S T R A C T

**Background:** Pregnancy and the early postpartum period represent critical windows for offspring neurodevelopment. Increasing evidence suggests that maternal stress during these periods may influence long-term cognitive, behavioural, and mental health outcomes. Biological markers of stress offer objective measures of exposure; however, their association with neurodevelopmental and mental health outcomes in children beyond early childhood remains insufficiently synthesised. **Methods:** This systematic review aims to synthesise available evidence on maternal biological markers of stress assessed during pregnancy and the first postpartum year, and their associations with neurodevelopmental and mental health outcomes in children aged over 3 years and across later developmental stages. The review is registered in PROSPERO (CRD420251163874) and conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A total of 1,447 records were identified through PubMed and Web of Science. Following abstract and full-text screening, six studies met inclusion criteria and were included in the final qualitative synthesis. **Results:** Included studies suggest that maternal stress-related biological markers—particularly neuroendocrine and inflammatory indicators—are associated with increased risk of adverse neurodevelopmental, behavioural, and mental health outcomes in children beyond the age of three years. Considerable heterogeneity was observed in biomarker type, timing of assessment, and outcome measures. **Conclusions:** Maternal biological stress markers during the peripartum period may serve as early indicators of vulnerability in offspring neurodevelopment and mental health. However, the limited number of eligible studies and methodological variability highlight the need for further longitudinal and mechanistically driven research.

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# The impact of childbirth-related PTSD on the mother-baby bond: Results from the International Survey of Childbirth-Related Trauma

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## A B S T R A C T

**Background:** Research suggests that childbirth-related post-traumatic stress disorder (CB-PTSD) may influence a mother's relationship with her baby, in terms of both avoidance of the infant or anxious overprotective behaviours towards the infant. It could be theorised that these may be related to the type of threat women perceive during a traumatic birth. For example, threat of injury or death to the infant may be linked to infant-focused anxiety. However, this has yet to be examined quantitatively. Therefore, the aim of this work is to understand whether CB-PTSD and CB-PTSD symptoms are associated with the mother-baby bond, in particular to examine whether the type of threat (threat of injury, death or both) and target of the threat (to the mother, infant or both) have a different impact on the mother-infant relationship. **Methods:** This research was part of an international study of CB-PTSD (INTERSECT). Women were recruited from 8 hospitals across England, Wales and Scotland and asked to complete the INTERSECT survey and other questions 6-12 weeks after birth. Women answered questions about birth trauma, CB-PTSD using the City Birth Trauma Scale, and their relationship with their infant using the Postpartum Bonding Questionnaire. **Results:** A total of 339 women completed the survey within the correct time frame. One in five (20.1%) women met DSM-5 stressor criterion A of perceived threat during childbirth. The majority of perceived threat was of injury (13.3%) and death (8.3%) to women, followed by injury (8.3%) or death to their baby (7.1%). The target of the threat (mother/infant/both) was associated with impaired bonding ( $KW = 9.72, p = .021$ ), but not rejection & anger ( $KW = 5.40, p = .145$ ) or infant-related anxiety ( $KW = 4.32, p = .229$ ). The type of threat (injury/death/both) was associated with significant differences in all measures of the mother-infant relationship, i.e. greater impaired bonding ( $KW = 9.40, p = .024$ ), more rejection & anger ( $KW = 10.51, p = .015$ ), and more infant-related anxiety ( $KW = 13.61, p = .003$ ). However, post hoc tests showed no consistent pattern in which type of threat was associated with poorer mother-infant relationship outcomes. **Conclusions:** Both the target of the threat and the type of threat influence mother baby bonding, although the patterns are unclear. Further research should be carried out to fully understand the influence of threat on different measures of the mother-infant relationship.

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# Methodological progress of WG2.1 in preparing a multicohort study on prenatal stress and early child development

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## A B S T R A C T

**Background:** WG2.1 is developing a multicohort study to examine associations between prenatal stress, measured through psychological instruments, clinical indicators and cortisol biomarkers, and early child developmental outcomes. **Methods:** Research questions focus on associations across developmental domains, mediation through maternal cortisol, moderation by sociodemographic and obstetric factors and cross-cohort heterogeneity. These guide the preregistration submitted to the Open Science Framework, which specifies hypotheses, key variables, harmonization procedures and planned statistical models. Eligible cohorts have been identified and contacted, and collaboration agreements are being collected. A comparative inventory of available measures is underway. **Results:** Preliminary mapping shows convergence in stress indicators and developmental assessments across cohorts, supporting feasibility for pooled analyses and shared operational definitions. **Conclusions:** Completion of variable harmonization and common criteria will enable integrated analyses, including multivariable regressions, mediation models and moderator tests. This groundwork will produce a high-quality multicohort dataset and advance WG2.1's scientific aims within TREASURE.

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## How to measure maternal peripartum psychological stress? A protocol for a scoping review

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### A B S T R A C T

**Background:** The peripartum period, from pregnancy to one year postpartum, is a time of transition for women, often accompanied by stress. Reliable measurement instruments are crucial for examining peripartum maternal stress and evaluating interventions. This study aimed to identify patient-reported outcome measures (PROMs) used to assess maternal stress during the perinatal period. **Methods:** A scoping review was conducted focusing on quantitative research papers on maternal psychological stress during the peripartum period, including adult women. PROMs could include either or both assessment of stressors or perceived stress, with either general or peripartum-specific measures. Different databases (PubMed, PsycInfo, CINAHL) were searched using carefully developed keywords. **Results:** 24,081 titles and abstracts and 1,729 full-texts have been screened. **Conclusions:** The findings from the final data-extraction phase will provide information on psychometrically valid general and peripartum-specific PROMs for use with peripartum women and inform on the need for new instruments on peripartum stress.

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## Risk and protective factors in the peripartum period: Trauma, support, and parity in Slovenian mothers

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### A B S T R A C T

**Background:** Maternal perinatal stress can escalate into parental burnout, adversely affecting maternal and infant well-being. This study investigates the prevalence and correlates of this syndrome to identify key targets for intervention. **Methods:** A cross-sectional study assessed 731 mothers (0–12 months postpartum) in Slovenia using the Parental Burnout Assessment (PBA). **Results:** The mean PBA score was 21.03 (SD = 22.43), with 3.3% of mothers exceeding the clinical threshold (> 86). Perceived birth trauma was positively associated with total burnout ( $r_s = .176, p < .001$ ), particularly emotional exhaustion. Conversely, partner support showed a protective negative correlation ( $r_s = -.192, p < .001$ ). Multiparous mothers reported feeling “fed up” ( $z = -4.29, p < .001$ ) and emotionally distant ( $z = -2.98, p = .003$ ) significantly more often than did primiparous mothers. Delivery mode showed no significant effect. **Conclusions:** Perceived trauma and multiparity are significant indicators of distress, while partner support acts as a buffer. These findings underscore the need for early screening and psychosocial support to optimize the peripartum period.

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# Depression, anxiety and CB-PTSD symptoms: A comparison of mothers of term and preterm infants

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## A B S T R A C T

**Background:** Mothers of preterm infants may face additional mental health challenges. Compare the prevalence of depressive, anxiety, and childbirth-related posttraumatic stress disorder (CB-PTSD) symptoms in mothers of term and preterm infants. **Methods:** 529 mothers (475 term, 54 preterm) completed questionnaires on sociodemographic, health data, EPDS, STAI-S, and City BiTS at two and six months postpartum. Prevalence was defined as a score  $\geq 1$  in item. **Results:** Particularly at six months, mothers of preterm infants reported higher prevalence in depressive symptoms (EPDS): item 1 (31.8% preterm vs. 21.9% term), item 7 (45.5% vs. 30.1%), item 8 (63.6% vs. 46.9%), and item 9 (45.5% vs. 31.6%); and CB-PTSD symptoms (City BiTS): item 13 (30.6% term vs. 43.5% preterm), item 14 (32.9% vs. 47.8%), item 17 (28.4% vs. 42.2%), and item 19 (27.3% vs. 39.8%). **Conclusions:** Monitoring mental health beyond 6 months after discharge is relevant for mothers of preterm children.

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# Digital support to reduce perinatal stress: A randomized controlled trial integrating maternal-infant biomarkers and early development

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## A B S T R A C T

**Background:** Maternal perinatal stress often remains undetected, increasing risks for adverse maternal and infant outcomes. Digital interventions may enhance early identification and support. This study evaluates whether a mobile application can improve maternal mental health and early developmental outcomes. **Methods:** In a randomized controlled trial, approximately 500 pregnant women at 12–16 weeks' gestation are allocated to a digital intervention or standard care and followed with their infants until 4 months postpartum (with extended follow-up to 24 months). Outcomes include wellbeing, depressive and anxiety symptoms, sleep, attachment, neonatal indicators, and early neurodevelopment. Biological measures include maternal and infant nail hormonal biomarkers (cortisol, serotonin, melatonin) and maternal-infant microbiome profiles. Data collection concludes in May 2025. **Expected Results:** The intervention is anticipated to improve maternal mental health and reduce stress-related biomarkers, with corresponding benefits for infants. **Conclusions:** Findings will clarify whether digital support can reduce perinatal stress while advancing understanding of how mental health relates to hormonal and microbiome biomarkers across the perinatal period.

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# Perinatal stress and associated psychological factors: A systematic review

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## A B S T R A C T

**Background:** Perinatal stress is linked to adverse maternal mental health and infant outcomes, but evidence on key psychological risk and protective factors is scattered. **Methods:** A systematic review was conducted in Scopus using the terms “perinatal stress”; and “mental health”, without time limits. Twenty empirical studies met the inclusion criteria. **Results:** Risk factors for higher perinatal stress and poorer mental health included smoking, previous health problems, history of child abuse, neurotic personality traits, repetitive negative thoughts, disadvantaged socioeconomic contexts, couple relationship problems and previous gestational loss. These factors were associated with greater depressive and anxious symptomatology and higher parental stress, which in turn affected infants' physical and socio-emotional outcomes. Protective factors included perceived social support, access to health care and training in coping strategies. **Conclusions:** Identifying modifiable psychological and contextual factors can guide non-pharmacological interventions to reduce perinatal stress and improve early developmental outcomes.

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# Effectiveness of psychological interventions in the treatment of perinatal anxiety: A systematic review of systematic reviews

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## A B S T R A C T

**Background:** Perinatal anxiety is highly prevalent and negatively affects maternal health, fetal development, and early bonding, highlighting the need for effective psychological interventions. **Objective:** To evaluate the effectiveness of psychological interventions for the treatment of antenatal and postnatal anxiety. **Methods:** A systematic review was conducted in accordance with PRISMA guidelines and registered in PROSPERO (CRD42024559081). Systematic reviews and meta-analyses published between 2000 and 2025 were retrieved from five databases. Methodological quality was assessed using the AMSTAR-2 tool. **Results:** Eight studies were identified. Interventions were heterogeneous, with a predominance of cognitive-behavioral approaches, including cognitive restructuring, exposure, and physiological regulation strategies, delivered in individual, group, or digital formats. Hybrid interventions incorporating mindfulness and guided online CBT programs were also reported, showing favorable outcomes. **Conclusions:** Psychological interventions appear to be potentially effective in reducing perinatal anxiety; however, heterogeneity and low methodological quality limit the strength of the evidence.

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# Motherhood and smartphone use: The unique case of Israeli women during wartime

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## A B S T R A C T

**Background:** War may fundamentally alter maternal digital behaviours and their impact on parenting. We examine changes in Israeli mothers' smartphone use and its associations with maternal well-being and mother-infant bonding following the October 7 attacks. **Methods:** Using a pre-post design, 245 mothers of infants reported smartphone use, mental healthcare needs, stress during phone use, bonding and maternal self-efficacy before/after the war. **Results:** Significant increases in wartime smartphone use were observed, with 59 mothers progressing from moderate to heavy/excessive use. Substantial increases in news consumption were also found. Maternal need for psychological treatment showed stronger correlations with excessive smartphone use post-war (.26) than pre-war (.15). Post-war correlations between stress and news consumption doubled (.18 to .36). **Conclusions:** War fundamentally disrupts maternal digital limits, yielding compulsive patterns that interfere with caregiving. Results indicate an urgent clinical need for preventive digital wellness programs that can maintain maternal sensitivity and infant development during wartime.

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## Co-designing an mHealth intervention with Latin women and healthcare professionals: A secondary study within the e-Perinatal project

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### A B S T R A C T

**Background:** Women from culturally minoritised backgrounds are at increased risk of perinatal mental health problems, yet culturally adapted preventive approaches remain limited. This study, within the European e-Perinatal project, aims to refine the e-Perinatal mHealth intervention by incorporating preferences of Latin American women and healthcare professionals. **Methods:** A qualitative co-design approach was conducted following COREQ and Patient and Public Involvement (PPI) principles. Two focus groups, one with Latin American women ( $n = 12$ ) and one with healthcare professionals ( $n = 8$ )— reviewed the app prototype and provided feedback. Thematic analysis was applied. **Results:** Themes included: user-related factors (e.g., concerns about childbirth, postpartum recovery, limited support); program-related needs (e.g., culturally relevant, multilingual, practical content); user experience preferences (e.g., simpler wording, clearer structure, audiovisual materials); and professional-related factors (e.g., cultural fit, usability, feasibility). **Conclusions:** Findings will support refinement of the app to enhance cultural relevance, usability, uptake, and integration into perinatal care.

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## Predictive modelling for adverse child events via statistical learning approaches

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### A B S T R A C T

**Background:** We aim to develop clinically relevant prognostic model for predicting adverse child outcomes at 18 months, assessed with the Child Behavior Checklist (CBCL), based on early-life information from the U-Birth study from Sweden ( $N = 2,882$ ). **Methods:** Maternal and infant data related to perinatal environment and infant behavior were collected at 6 months postpartum. Models were fitted using different statistical learning techniques separately for the internalising and externalising symptoms. **Results:** Preliminary findings suggest that a combination of perinatal maternal bonding difficulties, anxiety, depressive symptoms together with infant variables were able to predict later internalising and externalising problems. Regularised and boosted models effectively reduced dimensionality and highlighted consistent early-life contributors. **Conclusions:** The emerging model demonstrates potential for a pragmatic, interpretable risk score supporting early detection of vulnerability. This work paves the way towards external validation on data from additional cohorts.

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