



Extended Research Article

Effectiveness and cost-effectiveness of community perinatal mental health services on access, experience, recovery/relapse and obstetric and neonate outcomes: the ESMI-II mixed-methods study

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Published October 2025
DOI: 10.3310/RRAP0011

Scientific summary

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Health and Social Care Delivery Research 2025; Vol. 13: No. 38
DOI: 10.3310/RRAP0011

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Scientific summary

Background

Perinatal mental health (PMH) disorders (mental disorders occurring in pregnancy or 2 years after childbirth) are widely prevalent, affecting one in five mothers. Women with PMH have distressing symptoms and poor functioning that can affect their relationships with their families and infant. There is growing evidence that PMH disorders are associated with pregnancy complications, poor childbirth outcomes, maternal deaths in the first postnatal year and long-term negative effects on child cognitive, social and emotional development. Stigma, lack of specialist services and trained staff, and lack of clinically feasible assessments, particularly for the parent–infant relationship, have meant access to mental health care has been poor. In the ‘Five Year Forward’ and ‘Long Term Plans’, NHS England invested over £365M to improve access to community perinatal mental health teams (CPMHTs), but the effectiveness of these services on women and children’s health and well-being is not known.

Objectives

1. Develop a taxonomy of variations characterising CPMHTs [work package (WP) 1].
2. Compare and validate two observational assessments of quality of mother–infant interaction for use by CPMHTs (WP2).
3. Evaluate the effectiveness and cost-effectiveness of CPMHTs (WPs 3 and 4).
 - WP3: Which CPMHT components promote access to treatment and which components work, for whom, in what circumstances, how and why to reduce PMH problems?
 - WP4: In women with pre-existing severe disorders are CPMHTs (compared with generic services) associated with:
 - higher levels of access to secondary care mental health services (generic and CPMHTs)?
 - lower risk of relapse?
 - improved birth outcomes?
 - greater cost-effectiveness?

Methods (2020–3)

Work package 1/RQ1

To characterise service variations [research questions (RQ1)], we created a taxonomy classifying CPMHT elements. Using published data, expert and patient consensus, we created a programme theory on optimal service provision. A programme theory explains how, when and why a programme is expected to work. We used service-level data gathered from CPMHT annual reports to NHS England (2020), NHS Benchmarking (2015–8), Royal College of Psychiatry Perinatal Quality Network, and National Maternity and Perinatal Audit (2017 and 2019) to develop the taxonomy relative to the programme theory.

Work package 2/RQ2

We assessed the reliability and predictive validity of two observational assessments of the parent–infant relationship. Observational assessments of the parent–infant relationship are considered superior to self-report, but there is a lack of consensus on which assessments have the best predictive validity to later child outcomes. We used video archive material from a prospective, longitudinal Medical Research Council-funded study from pregnancy to school age (The Wirral Child Health and Development Study) to evaluate the Parent–Infant Interaction Observation Scale (PIIOS; for use with infants 2–8 months) and the National Institute for Child Health and Human Development (NICHD; for use with infants) system. Using 250 mother–infant interactions recorded at 6–8 months of age, 2 research assistants coded 3-, 5- and 7-minute clips from the 7-minute recorded observation available using each system. Inter-rater reliability and intrarater reliability were assessed. Predictive validity was determined in relation to (1) attachment security from the

Strange-Situation Paradigm and (2) child internalising (emotional) and externalising (behavioural) problem scores from the Brief Infant Toddler Socio-Emotional Assessment (age 1 and 2) and Pre-school Child Behaviour Checklist at school entry. We tested whether we could identify a briefer reliable and valid form of either assessment for use in routine clinical practice.

Work package 3/RQ3

We carried out a realist evaluation assessing components of CPMHTs that promoted treatment access and perceived outcomes (RQ3). Using WP1 typology and programme theory, we selected 10 CPMHTs for variations on service components and configurations (e.g. level of mother–infant/psychological interventions, integration with other services). We employed a purposive sampling approach (with maximum variation in characteristics), to identify and interview at least 10 women, their (consenting) partners or close other (CO), and up to 10 staff from each service to help us refine and test aspects of our programme theory, which identified how programme activities were associated with outcomes. Women were eligible if they were near the end of their care with the CPMHT or had finished care within the past 2 years. Interviews, up to 60 minutes in duration, assessed domains from our programme theory (e.g. experiences/acceptability of care, service components they believed made a difference to their care and outcomes and how this made an impact on their mental health and functioning with their family, including their infant). Where individuals had ‘less successful’ outcomes, we asked them for their opinions on what might have helped. We asked partners/CO related questions about impact of care received and how/if the CPMHT involved the CO. We asked staff how teams operate, which service components improve mother and baby outcomes, and which populations CPMHTs work best for. We also gathered service-level data on monthly referral numbers, referral source, ethnicity of women on the service and staffing breakdown. A realist logic of analysis was used.

Work package 4/RQ4

We used linked NHS routinely collected data from the Maternity Services Data Set, the Mental Health Services Data Set and the Hospital Episode Statistics between 2016 and 2019. Using an initial data set from 2016, we firstly examined associations between women who had a history of severe and complex mental health problems and obstetric and neonatal outcomes. We investigated whether there was a relationship between severity, as indicated by an acute hospitalisation, and recency of the mental health problem and these outcomes.

For RQ4, we used data between 2016 and 2019 and we compared areas with a CPMHT to those without on women’s access to secondary mental health care, acute post partum relapse (defined as admission to either inpatient or crisis team care), duration of admissions and associated costs. We also examined obstetric and neonatal outcomes (including birthweight, prematurity and infant death and stillbirth) for perinatal women with a history of severe and complex mental health problems in areas with CPMHTs compared to those without.

Results

Work package 1/RQ1

In 2020, there were 55 CPMHTs. This represented coverage across 94.8% of mental health trusts in the country. Using staff configurations that captured variations in service provision relative to the programme theory, we created a hierarchical taxonomy consisting of a basic, foundational classification of services based on presence of a psychiatrist, nurse and psychologist (84% of CPMHTs), and a secondary, comprehensive level with greater service differentiation in line with key domains in the long-term plan (63% of CPMHTs). These included the basic classification as well as occupational therapists and nursery nurses.

Work package 2/RQ2

We found evidence for the reliability and predictive validity of the total-score PIIOS and a three-item form of the NICHD (NICHD-3; parental sensitivity, intrusiveness and positive regard/warmth), and the total-score PIIOS. No shorter form of PIIOS was identified with sufficient predictive validity. Filming for a 5-minute period achieved optimal reliability and predictive (discriminative) validity to age 2 mental health outcomes for both NICHD-3 and PIIOS total score, although PIIOS had broader predictive validity to age 2 internalising and externalising mental health outcomes. Neither

observational tool predicted longer-term mental health outcomes at school entry, consistent with the high number of intervening events in this time period.

Work package 3/RQ3

Across 10 different CPMHTs, we interviewed 139 women, 55 partners/CO and 80 health and social care practitioners to determine effective CPMHT components. As predicted, comprehensive CPMHTs resulted in improvements in the experiences and mental health outcomes of women and infants, with some women stating CPMHTs were a 'transformative' experience. These improvements were grounded in the collaborative, integrative care provided between comprehensive CPMHTs and other health providers. Integration across care pathways was greatest with maternity, mother and baby hospitals, obstetrics, and crisis teams and was lowest with general practitioners and adult mental health.

Perinatal women with mental health disorders strongly preferred treatment from health professionals with specialist PMH knowledge as they felt these individuals were best placed to understand their complex family-related needs. Women described style of treatment delivery as critical to their perceived outcomes, including compassionate, open, non-judgemental care. These factors were associated with their perceptions that they got the 'right' treatments and their descriptions of their level of treatment engagement. The value of adaptable treatment catering to changing schedules and locations (home, clinic, remote, etc.) was emphasised.

A holistic approach, typically combining pharmacological and relational treatments, yielded positive perceived results. Women appreciated the CPMHTs' expertise optimising their medication by providing comprehensive, up-to-date information on the risks and benefits of medications during the perinatal period. This was especially important for women with severe mental illness (SMI). Women described how CPMHTs reduced isolation and stigma by improving social connectedness among parents, enhanced social support and reduced family conflicts, facilitated better bonding between mothers and their infants, and equipped women with emotional management skills while supporting their engagement in meaningful activities. Expansion of CPMHTs to meet the long-term plan was ongoing during the evaluation, with varying provision across different teams. While SMI care pathways were robust in most teams, disparities in referral pathways and interventions for other mental health problems were apparent. For example, some CPMHTs lacked psychological support, with negative effects on women with post-traumatic stress disorder, obsessive-compulsive disorder, anxiety and depression. Treatments that directly intervened with the parent-infant or couple's relationship were not yet widely available. This especially affected women who had experienced acute or complex trauma, and those who described experiencing problems bonding with their baby and/or heightened conflict in their relationships.

Numbers of ethnically diverse women seen in CPMHTs were lower than expected based on local prevalence estimates.

Work package 4/RQ4

We found that depending on definition, between 7% and 9% of women had histories of secondary mental healthcare contact, indicating presence of a severe and complex mental health disorder. We found a significant increased risk for negative obstetric and neonatal outcomes in women who had a history of severe and complex mental health disorders, as indicated by previous contact with secondary mental health care. These risks were greatest for women with the most severe mental health problems, as indicated by a history of hospitalisation, and those who had contact in the last year with secondary mental health care.

When comparing mental health treatment access and related costs in areas with and without CPMHTs (RQ4), we found greater access to higher overall use of community mental health treatment and lower risk of acute relapse (lower rates of hospitalisation or crisis resolution teams). When examining acute care components separately, there were more acute hospitalisations and longer durations of stay and less use of crisis resolution teams in areas with CPMHTs compared to those without. These differences resulted in overall higher costs in areas with CPMHTs [mean £651, standard deviation (SD) 4634] compared to areas without (mean £414, SD 4196) which were statistically significant [fully adjusted mean difference £111, 95% confidence interval (CI) £29 to £192, $p = 0.008$]. There were higher risks of neonatal death and stillbirth and the birth of a baby small for gestational age in areas with CPMHTs versus those without, but lower risks of premature births.

Conclusion

Between 7% and 9% of women had a history of serious and complex PMH problems and they were at increased risks for negative obstetric and neonatal outcomes.

The availability of CPMHTs, relative to areas without CPMHTs, increased overall use of specialist mental healthcare services and reduced postnatal risk of acute relapse. This was associated with overall higher costs in areas with CPMHTs. Our results also suggest the risks of stillbirth/neonatal death and babies born small for gestational age may increase with a CPMHT.

There was considerable variation in CPMHT configurations. Those with comprehensive provision provided greater access to a wider range of evidence-based care across mental health problems but many still lacked parent–infant and family treatment offers. CPMHTs were often not serving expected numbers from diverse communities.

Feasible parent–infant assessments are available and may help to highlight need and ensure parent–infant dyads get appropriate care. We found both the PIIOS and NICHD-3 were valid and reliable assessments of the parent–infant relationship, but the NICHD-3 may have greater clinical utility due to its brevity to train (2 days vs. 3 days) and code (~15 minutes vs. 20–30 minutes), its predictive validity to attachment security and externalising problems, and application from 3 to 24 months of age.

Implications for health care

- WP2 showed that the PIIOS mother–infant assessment had broader predictive validity to child outcomes at age 2 but should only be used with infants between 2 and 8 months. The NICHD-3 had good predictive validity, is shorter to train and code and can be used with a broader age range between 3 and 24 months, so may be more appropriate for CPMHTs.
- WP3 demonstrated CPMHT staff need perinatal specific training and supervision to ensure they have the perinatal specialist skills women want and benefit from.
- WP3 found staff's 'soft skills', being warm, non-judgemental, reliable and offering outreach, made a key difference to women's engagement and outcomes. Despite their importance, 'soft skills' often go unmeasured and undervalued in mental health services. A culture shift is needed to prioritise, support and value 'soft skills'. This should include training, job planning to include time for these skills, measurement, performance management and assessing staff attitudes.
- In WP3, women and COs benefitted when family was included in treatment (with woman's permission). Our results highlighted reducing conflict and improving support, approaches aligned with recommendations from NHS England's guide on good practices for partners and family members.
- WP4 showed CPMHTs are effective at improving access to needed and effective treatments, but pregnancy/neonate outcomes are an area of concern. Further research into the causes of this relationships is urgently needed, but several steps may help to promote positive outcomes. First, CPMHTs should encourage collaboration between mental health services and maternity/neonate services to ensure equitable attention to both health and mental health concerns. Second, treatment burden may affect women/birthing people (bp) ability to attend both health and mental health appointments. Colocated services and joint clinic sessions could reduce treatment burden. Lastly, training mental health practitioners on the physical health needs of women could support improved potential for timely communication with maternity for health concerns.

Research recommendations

- We need to know the biological, social and healthcare determinants of increased neonate risk in areas with CPMHTs.
- Routine mental health data have very high levels of missing data on diagnosis and mental health outcomes. CPMHTs have also had limited time to fully embed themselves into practice, making it difficult to retrospectively assess their impact on women and their babies. Prospective studies that recruit women from case identification and follow them

through the perinatal period and with longer-term follow-up assessing mental health, service use, health and linked child outcomes are needed to reliably assess the effectiveness and cost-effectiveness of CPMHTs.

- Research should focus on the development, evaluation and implementation of interventions tailored for underserved and diverse perinatal populations.
- WP4 data were based solely on secondary care data. A broader approach, using primary care data sets, data on talking therapies and aspects of different characteristics of CPMHTs could include women with a wider range of problems and severity and provide a better understanding of treatment components that work across the care pathway.
- Future research needs to evaluate the NICHD and PIIOS measures' sensitivity to change following parent-infant intervention.

Study registration

This study is registered on Research Registry as [researchregistry5463](https://www.researchregistry.com/record/researchregistry5463).

Funding

This award was funded by the National Institute for Health and Care Research (NIHR) Health and Social Care Delivery Research programme (NIHR award ref: 17/49/38) and is published in full in *Health and Social Care Delivery Research*; Vol. 13, No. 38. See the NIHR Funding and Awards website for further award information.

Health and Social Care Delivery Research

ISSN 2755-0079 (Online)

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Editorial contact: journals.library@nihr.ac.uk

This journal was previously published as *Health Services and Delivery Research* (Volumes 1–9); ISSN 2050-4349 (print), ISSN 2050-4357 (online)

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This article

The research reported in this issue of the journal was funded by the HSDR programme or one of its preceding programmes as award number 17/49/38. The contractual start date was in June 2019. The draft manuscript began editorial review in September 2023 and was accepted for publication in March 2025. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HSDR editors and production house have tried to ensure the accuracy of the authors' manuscript and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this article.

This article presents independent research funded by the National Institute for Health and Care Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, the HSDR programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, the HSDR programme or the Department of Health and Social Care.

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