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Improving parental mental health in the perinatal period: A review and analysis of quality improvement initiatives

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ABSTRACT

Parental mental health is an essential sixth vital sign that, when taken into consideration, allows clinicians to improve clinical outcomes for both parents and infants. Although standards exist for screening, referral, and treatment for perinatal mood and anxiety disorders (PMADs), they are not reliably done in practice, and even when addressed, interventions are often minimal in scope. Quality improvement methodology can accelerate the implementation of interventions to address PMADs, but hurdles exist, and systems are not well designed, particularly in pediatric inpatient facilities. In this article, we review the effect of PMADs on parents and their infants and identify quality improvement interventions that can increase screening and referral to treatment of parents experiencing PMADs.

Introduction

Parental mental health is an essential sixth vital sign. Attention to parental mental health is critical for achieving optimal health outcomes for both parents and infants.[1] It also helps advance the principles of family-centered care which has been shown to lead to better outcomes and experience of care.[2] Perinatal mental health diagnoses are wide-ranging, including depression, anxiety, acute stress disorder, and post-traumatic stress disorder (PTSD), and are commonly referred to as Perinatal Mood and Anxiety Disorders (PMADs).[3] They can occur during the antenatal, early postnatal (first 6 weeks), or in the late postnatal period up to one year after birth. A review of maternal deaths between 2017 and 2019 conducted by 36 Maternal Mortality Review Committees identified mental health conditions as the leading cause of pregnancy-related deaths (22.7 %), with suicide being the most frequent occurrence.[4] The economic burden on the US economy was estimated to be $14 billion for the 2017 birth cohort between conception and the 5-year postpartum period.[5] The American College of Obstetrics and Gynecology (ACOG),[6] the American Academy of Pediatrics (AAP),[7] and the US Preventative Services Task Force,[8] all advocate for routine assessment of parental mental health, yet consistent implementation in clinical practice is lacking. There is an urgent need for improved screening and treatment of perinatal mental health disorders in perinatal practice. In this article, we review the effect of PMADs on parents and their infants. Next, we discuss how quality improvement (QI) approaches can be used to increase screening, referral, and treatment of parents experiencing PMADs.

Abbreviations: AA, American Academy of Pediatrics; ACOG, American College of Obstetrics and Gynecology; CBT, Cognitive Behavioral Therapy; EHR, Electronic Health Record; EPDS, Edinburgh Postpartum Depression Scale; GAD-7, Generalized Anxiety Disorder-7; IHI, Institute for Healthcare Improvement; IPT, Interpersonal psychotherapy; NICU, Neonatal Intensive Care Unit; PHQ, Patient Health Questionnaire; PMADs, Perinatal Mood and Anxiety Disorders; PPD, Postpartum Depression; PPCV, Parental Perceptions of Child Vulnerability; PTSD, Posttraumatic stress disorder; QI, Quality Improvement; QOL, Quality of Life; VCS, Vulnerable Child Syndrome.

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Impact of PMADs on parent mental health

Incidence and timing of onset of PMADs

Postpartum depression (PPD) is the most common PMADs. Rates of PPD differ according to the timing of measurement and the type of tool used (self-reported screening tool vs. interview).[9] Meta-analyses of maternal depression in high-income countries estimate a prevalence of 11 % during pregnancy and 13 % after delivery.[3,10] In addition to maternal PPD, paternal PPD has been identified in 10 % of fathers.[11] Paternal PPD is frequently comorbid with maternal PPD. In 2 - 3.18 % of couples, both parents experience postpartum depression concurrently.[12] The onset of PPD is more common after delivery (40 %) (6 weeks to 3 months postpartum) in mothers of term healthy newborns[13,14] compared to pregnancy (33 %).[15] For fathers, rates of PPD peak at 3- to 6 months postpartum.[11] PPD may occur however as early as 2 weeks postpartum for those confronting a neonatal intensive care admission (NICU) or appear any time within the first year after birth.[16,17] For those whose infants experience a NICU stay, another peak of depressive symptoms occurs at the time of NICU discharge (45 %).[18] While data suggest typical patterns of onset, it is important to remember that each parent is unique, often with different timing in their response to stressful and traumatic experiences (e.g., an infant in the NICU whose medical course is different from what was expected). Some parents have an immediate mental health response, while others will have a delayed response. In addition, for some parents, symptoms may gradually improve while for others, symptoms linger and may veer toward chronicity.[19]

Research on perinatal anxiety disorders is less robust.[12] Studies in the general population suggest maternal anxiety rates between 7.9–19 % and paternal anxiety as high as 10 %.[20–22] In addition 11 % of couples experience anxiety concurrently.[12] PTSD, which is commonly comorbid with PPD, may occur because of traumatic pregnancy and birthing experiences, particularly in parents of NICU infants who are considered high-risk. In a meta-analysis,[23] the prevalence of PTSD during pregnancy was 3.3 % in community samples and 18.95 % in high-risk samples, while after birth, the prevalence was 4.0 % in community samples and 18.5 % in high-risk samples. Symptoms of PTSD include hyperarousal, avoidance, and re-experiencing of the event. Unfortunately, PTSD is less commonly recognized and takes longer to diagnose requiring symptoms to be present for at least 1 month, so many parents will be missed during a NICU admission.[24]

Risk factors

Many factors place parents at a higher risk for PMADs, but all generally fall into three categories:

1. Stressors such as infant hospitalization or maternal birth complications, preterm birth, low socioeconomic status, and birth trauma (e.g. emergency, unplanned C-section).[25] Parents of infants hospitalized in the NICU are at increased risk for mental health conditions compared to parents of well-newborn infants. Studies of parents of preterm infants have shown that 40 % suffer from depression,[26] 48 % from anxiety,[17] and up to 33–49 % develop PTSD.[27,28]
2. Low social support, those experiencing intimate partner violence, single parenting, and marital discord.[29–31]
3. A previous history of mental health disorders or alcohol and substance abuse.[32] There is also an association between PMADs, in particular perinatal depression and PTSD, and childhood maltreatment.[31]

Additionally, the frequency of PMADs, its detection, and mental health treatment differs by race.[33] The rate of postpartum depression is disproportionately higher among Black and Hispanic birthing persons compared to their white counterparts.[34,35] Black and Hispanic birthing parents are less likely to be diagnosed with PMADs[36,37] take more time to initiate a mental health visit, are less likely to refill a prescription for medication or schedule follow-up visits, and have less access to mental health resources.[38,39] Fragmented care from inconsistencies across both the perinatal and mental health care systems, lack of a team-based care approach, as well as structural barriers also make it harder for Black and Hispanic birthing persons to access mental health support. Immigrant populations also face difficulties in PMADs recognition and access to care due to barriers like transportation, language, immigration status, finances, and cultural stigma.[40]

Effect of PMADs on parents

PMADs can affect the birth parent in many ways. PMADs, specifically PPD, present with symptoms like poor concentration, feelings of excessive guilt or low self-esteem, hopelessness about the future, disrupted sleep, and thoughts about dying or suicide. The degree of feelings varies and can go from loss of any joyful moments to thoughts of self-harm and suicidal ideation. In severe cases, the loss of life due to suicide may occur. Based on a systematic review conducted by Slomian, et al.,[41] mothers experiencing PPD can experience long-term physical, psychological, and quality of life (QOL) issues. Studies that evaluated physical health found mothers with PPD had limitations in their physical function due to depression and decreased healthcare utilization. Psychologically, mothers who experienced PPD had existing depression more than 1 year later and high anxiety up to 3.5 years after birth compared to mothers who did not experience PPD. Mothers experiencing PPD also had lower QOL scores on validated assessments and increased sexual dysfunction impacting relationships. Additionally, they were more likely to exhibit addictive behavior including tobacco and substance use. PPD in particular interferes with bonding and caregiving behaviors including reduced responsiveness to the baby's cues and a decrease in affectionate touch which can interfere with the development of secure attachment.[42] There is also a relationship between PPD and mental health functioning in the partners of affected women.[43] All of the maternal impacts of PPD can impact the health of the infant.

Effect of PMADs on infants

PMADs may have long-term effects on both child development and parenting practices. Children whose mothers have PPD have higher rates of psychological problems, including anxiety and depression when studied at 8 years of age.[44] Fihlrer et al.[45] have shown higher rates of behavior disorders in 6–8 year-old children exposed to PPD in the first year of life. Suryawanshi[46] has shown adverse long-term effects on infants' social, emotional, and behavioral problems, and other studies show higher rates of intellectual disabilities.[47,48] PMADs have also been linked to decreased child bonding and attachment,[1] decreased parental positive interactions,[49] and decreased breastfeeding duration and milk production.[50]

Adverse effects of PMADs on parenting may create a pattern of overprotective parenting that manifests in symptoms of Vulnerable Child Syndrome (VCS).[51] VCS describes how a parent's mental health response to a child's medical experience impacts their perceptions of their child's vulnerability. This is particularly relevant in the context of premature or medically fragile infants admitted to the NICU in the setting of PMADs. When a child is admitted to the NICU, many parents have natural emotional responses of sadness, fear, guilt, and anxiousness. These emotional responses, reduced opportunities to provide traditional parental care (e.g., holding and feeding), and repeated exposures to their child's traumatic medical experiences can contribute to the higher prevalence of PMADs in NICU parents and increased parental perceptions of child vulnerability (PPCV). Decreased parenting confidence and heightened PPCV contribute to increased "worried-well" visits and avoidable health care utilization after discharge.[52] In addition, studies document delayed cognitive and language skills,[53] poor social

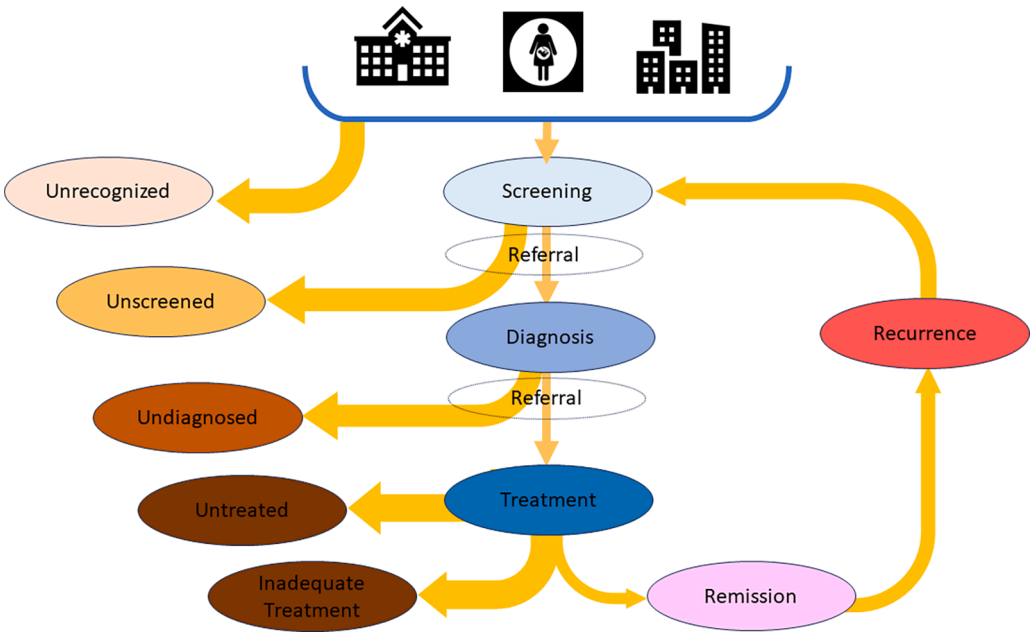

Fig. 1. Process Map of the perinatal depression "treatment cascade" showing areas of patient dropout from recognition and treatment (Bold arrows). These areas provide many opportunities for improvement where interventions can improve parental mental health. Based on data from Cox et al.2016. .[56]

skills, school performance problems, high perseveration on minor bodily symptoms, and increased adolescent depression and anxiety[54,55,51] among children of parents with untreated PMADs and VCS.

Employing quality improvement in PMADs

Due to the effects of PMADs on both parent and child outcomes, it is important to focus on early identification and treatment. Clinical programs that address PMADs in perinatal care settings have been difficult to establish. The process of screening, diagnosing, and ensuring referral to treatment involves many steps (Fig. 1) and barriers can exist at each step.

Clinicians commonly cite time constraints, funding barriers, inadequate training in diagnosis and counseling, lack of parent educational resources, lack of reimbursement, and scarcity of mental health providers as significant barriers. In a survey performed by the American Academy of Pediatrics Trainees and Early Career Neonatologists National Advocacy Campaign (Carousel Care (www.carouselcare.org)), most participants stated that PMADs were not adequately addressed in their clinical setting and that they did not feel comfortable asking parents about their mental health (personal communication from Carousel Care leadership team).

The application of quality improvement (QI) methodology can be a useful approach to systematically create successful perinatal mental health programs within individual perinatal practice settings. We identified several published QI initiatives in outpatient (Table 1) and inpatient pediatric and obstetric settings, including the NICU (Table 2), as well as at the state and regional levels, that have aimed to improve the screening, diagnosis, and treatment of PMADs. We focused on published initiatives directed at improving screening and referral to treatment for PPD, but similar strategies can be applied to other PMADs.

QI initiatives in community-based and outpatient settings

Several published QI reports have documented efforts to implement screening and referral to treatment for PPD in community-based and outpatient clinics (Table 1). At a women's health clinic, Clevesy et al.[59] increased screening from 56 % to 92 % through a combination of clinician education, an electronic health record (EHR) dialog box showing screening criteria and cut-offs for a positive screen, standardized use of the Edinburgh Postpartum Depression Scale (EPDS) screening tool, placement of an electronic flag in the charts indicating completion of the screen for later auditing, and development of a referral system to area mental health providers. Similar results were achieved in a rural obstetric clinic.[61] Hughes et al. employed a decision aid to help with maternal shared decision-making, and a checklist to close the loop on referrals, followed by a phone call 1 week after the visit for those screening positive.[61] Johnson et al. (2021)[62] furthered this approach by partnering with a perinatal wellness program to provide free 30-minute consultations twice weekly in the clinic. Similarly, Bennett et al.[58] reported on a QI collaborative of 10 family medicine practices that significantly improved rates of prenatal screening, although they did not show improvement in rates of postpartum screening. The interventions involved establishing evidence-based guidelines for clinicians, participation in collaborative calls, and audits as part of a broad bundle of preventive care. In an outpatient midwifery practice, changes in workflow by simple interventions such as placing stickers on the front page of the patient's chart prompted providers to have in-person discussions and provide patient educational materials. This initiative improved education rates from 0 % to 43 %.[60] It is notable that this practice utilized an already established workflow using the maternal visit for a glucose tolerance test to introduce this education antenatally. This is particularly useful since depression may occur much later during pregnancy or after childbirth. By initiating the conversation with parents early and having access to material, mothers were encouraged to reach out later and ask for help and this allowed staff easy retrieval of resources. QI initiatives in outpatient pediatric clinics have also shown improvement through changes in workflow, i.e., dissemination of the screening tool before the visit or before the encounter.[73]

A number of outpatient settings used home visiting to support screening and treatment of PMADs. Lewis et al.[65] described the development of a protocol to manage PMADs at home by health visitors in the United Kingdom. Health visitors are public health nurses or midwives who visit postpartum mothers and their infants and administer healthcare at home antenatally and up to a year after birth. The health visitors recognized the importance of mental health and developed a protocol to initiate and pursue mental health conversations with parents. The

Table 1
Quality improvement (QI) studies addressing screening and referral for PMADs in outpatient settings. Some studies are implementation studies or studies of program development and did not follow strict QI methodology. They were included based on the value of the interventions proposed. EHR, Electronic health record: SSRI, selective serotonin uptake inhibitors.

Authors	Setting (n)	Discipline	Person administering screen/Timing	Interventions	Baseline screening rate (%)	Screening rate after intervention (%)	Referrals /treatment improvement (%)
Avalos 2016 [57]	Outpatient (15 medical centers and their clinics)	OBGYN and pediatrics	Not reported	- Champions - Provider education - Collaborations with behavioral health facilities for referrals - Development of screening guidelines	0	49	3 improvement (difference statistically significant)
Bennet 2009[58]	Outpatient clinics (10)	Family Medicine	Physicians Antenatal (≤15 weeks gestation) and Postnatal (≤16 weeks)	- Validated screening tool and evidence-based guideline development - Participation in a QI collaborative with monthly calls - Audits	Antenatal 35–65 Postnatal 45–60	Antenatal 80–85 Postnatal 45–60	Not reported
Clevesy 2019[59]	Community clinic (1)	Obstetrics	Physicians and Nurses Postnatal 4 week visit	- Validated screening tool - Clinician education - EHR decision support and documentation - Audit tool-flag in EHR - Referral system	56	92.7	Not reported
Gillis 2019[60]	Midwifery outpatient practices (2)	Obstetrics	Certified Nurse Midwives Antenatal (24–29 weeks gestation)	- Patient educational handout and anticipatory guidance - Clinician training on bundle - Resource lists of local and online mental health resources - Clinical workflow change- Registration staff and medical assistants placed a sticker on the chart as a reminder of eligibility for anticipatory guidance and education. - Utilized existing workflow- visit for glucose tolerance test and private rooms (not waiting area)	Not reported	Not reported	43.1
Hughes 2023[61]	Rural outpatient clinic (1)	Obstetrics	Physician, nurse practitioner, midwife, nurses, front desk staff Antenatal (initial visit, 3rd trimester) and Postnatal 6week visit	- Validated tool - Clinician education - Decision aid - Point of care follow-up checklist for referral and treatment - Workflow involved registration staff handing out tool - Follow-up calls for +ve after visit - EHR included score to support review - Log of referrals	17	98	75
Johnson 2021[62]	Urban private practice (1)	Obstetrics	Physicians, Midwives, Nurse practitioners, Medical assistant Antenatal visits (twice) and once postnatal	- Validated screening tool - Clinician education - Mental health professional twice weekly in clinic in partnership with a wellness center - Referral resources - EHR documentation with monthly reports - Laminated card is given to the front desk to schedule mental health referrals discretely	Prenatal intake 24.9 3rd trimester 0.3 Postnatal 79	Prenatal intake 64.2 3rd trimester 32.8 Postnatal 79	15
Katon 2017[63]	Veteran's affairs women's health clinic (12)	Obstetrics	Maternity care coordinator Prenatal initial and at 28 weeks and Postnatal 6–8 weeks	- Validated screening tool - Dedicated maternity care coordinator and on-site social worker - Crisis response algorithm - Referral mechanism with same day access to outpatient mental health clinic	Not reported	46–90	77 met with social worker 88.6 positives had outpatient mental health care
Lanuza 2021[64]	Women's health clinic (1)	Obstetrics	Front desk, clinical staff Prenatal 28–32 weeks and Postnatal 6 weeks	- Validated screening tool - Clinician education - Resource directory - Stage-based treatment options - Parental education through teach-back and shared decision-making - Closed-loop referral system	15	95	100

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Table 1 (*continued*)

Authors	Setting (n)	Discipline	Person administering screen/Timing	Interventions	Baseline screening rate (%)	Screening rate after intervention (%)	Referrals /treatment improvement (%)
				- 1-week follow-up phone call for positives			
Lewis 2011[65]	Home visits	Adult Primary health care /Obstetrics	Midwife and Health Visitor (nurse) Antenatal and during the first year Postnatal	- Standardized protocol - Clinician education booklet and decision support (care pathways) disseminated to the community - Referral resource information - Audit and review	Not reported	Not reported	Not reported
Lind 2017[66]	Community-based clinics	Multispecialty	Providers Postnatal obstetrical visits and 1-, 2-, and 4-month well-child visits	- Validated screening tool - Clinician education -Decision aid/algorithm for response - Standardized process across all clinics - Severity based referral to mental health department within the system -Centralized submission to the mental health department	Not reported	88.8	44.8 % of positives received SSRI 21.4 attended mental health visit
Loudon 2016[67]	Outpatient clinic (1)	Obstetrics	Physician Postnatal 6 weeks	- EHR hard stop to input PPD screen data into the chart before closing	53	99.5	Not reported
Mgonja 2017[68]	Outpatient clinic (1)	Pediatrics	Nurses and providers Well-child visits up to 1 year of age	- Validated screening tool - Clinician education - Decision aid/algorithm - Billing education - Weekly reporting of compliance rate to staff	0	78.7	Not reported
Robidoux 2023[69]	Outpatient clinic (2)	Pediatrics	Community health workers and providers 1-, 2-,4- and 6-month well-child visits	- Validated screening tool - Decision aid/algorithm - Parent education - Referral resources - 1-week follow up with parent	45	66	22
Russomagno 2019[70]	Rural outpatient clinic (1)	Pediatrics	Providers and nurses 1-, 2-,4- and 6-month well-child visits	- Validated screening tool - Decision aid/algorithm based on risk - Clinician education and training - EHR documentation changes - Weekly check-in to determine barriers - Resource referral list	33	80	79
Schaar 2013[71]	Outpatient clinics (9)	Obstetrics	Providers, nurses, front desk staff	- Validated screening tool - Decision aid/algorithm based on risk - Clinician education and training - Office staff training - Log book	Not reported	39–100	Not reported
Sorg 2019[72]	Federally-qualified health center (1)	Pediatrics	Medical assistants and nurses 1-, 2- and 6-month well-child visits	- Validated screening tool - Decision aid/algorithm based on risk - Clinician education - Parent education - Social work referral for positives - Notification of the maternal PCP of positives	83	88	Not reported
Sudhanthar 2019[73]	Outpatient clinic (1)	Pediatrics	Pediatricians and trainees 1-, 2-, and 4-month well-child visits	- Validated screening tool - Clinician education - Referral resources - Registration staff handing out the screening tool - Audit	0	82–85	23
Tandon 2020[74]	Home visiting program (14)	Home visitor programs in 8 states	Trained staff and nurses Prenatal- 3 months from enrollment and Postnatal for first 3 months	- Specific policies and protocols for screening - Decision aid for response - Crisis response protocol - Home visitor education and training - Parent education material - Parental prevention and treatment interventions - Tracking systems for screening, referral, and follow-up	83.6	96.3	Not reported
Toler 2021[75]	Birthing centers (9)	Obstetrics	Midwives Postnatal visit	- Clinician education - Validated screening tool	Not reported	89.6	Not reported

(*continued on next page*)

Table 1 (*continued*)

Authors	Setting (n)	Discipline	Person administering screen/Timing	Interventions	Baseline screening rate (%)	Screening rate after intervention (%)	Referrals /treatment improvement (%)
Zapulla 2023[76]	Outpatient (1)	Obstetric	Licensed clinical staff Postnatal 4–6 weeks	- Decision aid and counseling tool - Referral resource guide - Collaborative centralized data collection - Validated screening tool - Clinician education - Standardized tool kit - Documentation in the EHR of why the screening was not performed - Weekly huddles during implementation	10.9	95.8	19.6

two-part protocol combined a step-by-step guide for the recognition and management of PMADs in addition to research and policy evidence. They used a bottom-up process that made it "credible and workable" and provided clarity to the frontline team. The authors did not report their screening or referral rates, but they stress that the involvement of frontline clinicians from the outset is necessary for change and sustainability of programs. Similar programs in the US utilize home visitors who are trained personnel and who are supported by mental health consultants. Tandon et al. report the results of a QI collaborative of 14 home-visiting programs, finding that 60 % of women screening positive experienced a 25 % improvement in depression symptoms within 3 months when home-visiting programs systematically provided evidence-based recognition and therapy for PMADs to low-income women.[74] A pediatric clinic has also shown the benefit of empowering community health workers co-located within the clinic to initiate and then refer the tougher cases to providers.[69]

QI initiatives in inpatient obstetric and neonatal intensive care units

Several published QI reports have documented efforts to implement screening and referral to treatment for PPD in inpatient perinatal care settings (Table 2). The inpatient obstetric setting provides an excellent opportunity for implementing screening for PMADs and establishing referral pathways for those who screen positive. Interventions previously described that are needed in the outpatient setting are also needed in the inpatient setting, though the workflows are different. Specifically, for PPD, because it is generally diagnosed a few weeks after delivery, the inpatient obstetric setting may not be appropriate for screening but instead for educating patients on the signs and symptoms, as well as arranging for outpatient follow-up within 2-weeks of delivery. Torti et al.[84] deployed an all-or-none bundle approach in 66 maternity care centers after delivery. While the inpatient setting was too early to detect PMADs symptoms, the initiative was successful in educating parents and providing resources for those who presented with symptoms later. They developed an integrated dashboard of bundle elements (score documentation, provider notification for positives, social work referral for positives, discharges held up for social work assessment, and parent education materials) populated by EHR-derived data and available to frontline staff who could correct deficiencies in real-time before discharge.

Due to many infants having long NICU lengths of stay, the NICU can be an excellent environment for screening, diagnosis, and treatment of PMADs, though there are unique considerations. Published rates of NICU screening for PMADs vary vastly from 22 to 98 %. Berns et al.[79] successfully implemented a nurse-led screening and referral program in the NICU in 8 weeks. Within two weeks of admission, the NICU nurse approached the mother to complete the EPDS screening. For mothers who screened positive, the nurse placed a consult for the licensed professional clinical counselor, and the patient was seen within three days. The nurses added prompts in their report sheets and screening was only performed once during the NICU stay. The program was successful because of dedicated funding for a licensed professional counselor. Metrics were tracked electronically and included: screening rates, referral rates (from consult orders), and mental health counselor visits (from visit notes). Brady et al.[78] employed nursing and public health students to screen both parents remotely, beginning during the COVID-19 pandemic, but also continuing after. The driver diagram showing the team's theory of change is displayed in Fig. 2. The team initially used the Patient Health Questionnaire (PHQ-2) two-item questionnaire, however found that it missed some parents, and instead began using the PHQ-9 for all (including the suicidality question even during remote screens). The authors stressed that documentation in the infant's EHR could expose sensitive parent information, particularly after the CURES ACT, and therefore had separate documentation outside of the infant's EHR. Fluctuations in personnel greatly affected their screening rate which ultimately improved from 28 % to 53 %. Grunberg et al.[82] developed a screening protocol specifically for inpatient NICU parents. Psychology doctoral students approached parents at the bedside 5 days after NICU admission and asked them to complete two screening measures; referrals were provided for those screening positive. Although they were only screened during weekdays for three hours, 39 % of eligible mothers and 21.5 % of eligible fathers were captured. The major barrier in 75 % of approaches was that parents were not at the bedside. A similar implementation project in the NICU was performed by Moreyra et al.,[83] offering 3 types of PMADs screening questionnaires to all mothers with infants admitted for 2 weeks or more. Screens were administered by social workers or a psychology postdoctoral fellow on paper or electronically through REDcap®. The team introduced the psychological screening for depression, anxiety, and PTSD by stating that it was a means of understanding parent experiences rather than just a standard measure to be completed by all. Scores were documented and positive screens on any of the questionnaires were addressed with a referral consisting of a 1-hour clinical interview with the psychology fellow, psychologist, or psychiatrist at the children's hospital. Any parent endorsing suicidal ideation was assessed for risk on the same day and a response was initiated according to risk level. Ninety-five percent of eligible parents completed screening with 27 % requiring a referral. Documentation of screening, referral, and resources (if needed) were placed in the child's EHR unless a sensitive history of trauma or suicidality was elicited requiring documentation in the parent's own chart.

Statewide QI initiatives

Implementation of PMADs screening, diagnosis, and treatment programs at the state level provides several centralized supports that can address a few of the barriers encountered when work is localized to a single perinatal inpatient or outpatient center. A full review of these programs is beyond the scope of this review, but we briefly highlight The Massachusetts Child Psychiatry Access Program for Moms (MCPAP for Moms)[85] created in 2013–2014. It is the most established care

Table 2
Quality improvement (QI) studies addressing screening and referral for PMADs in inpatient settings. Some studies are implementation studies or studies of program development and did not follow strict QI methodology. They were included based on the value of the interventions proposed.

Authors	Setting (n)	Discipline	Person administering screen/Timing	Interventions	Baseline screening rate	Screening rate after intervention (%)	Referrals /treatment improvement (%)
Accortt 2022[77]	Postpartum recovery unit and Maternal Fetal care unit (1)	Obstetrics	Nurses Postnatal within 2 days after delivery	- Nurse champion - Validated screening tool - Clinician training - Standardized workflow - Video Training - Patient education material - Opt-out approach when talking to mothers (screen is standard of care and mothers can opt-out)	10	99	8.4
Brady 2023[78]	NICU (1)	Neonatology	Nurses, nursing and public health students Postnatal 14 days after delivery	- Validated screening tool - Clinician education and training - Parent education - Standardized process for identification of eligible parents - Standardized follow-up - Screening by phone by students - Notification of results to the team - Referral resources	28	53	100
Berns 2021[79]	NICU (1)	Neonatology	Nurses, Mental health counselor Postnatal 14 days after admission	- Clinician education - Validated screening tool (paper) - Dedicated counselor - Easy referral to a clinical counselor by placing phone numbers on nurses' speed dial. - Prompts in the nurse's report sheets - Review of screening rates, consult orders in EHR, and psychotherapy notes.	0	78	24
Brownlee 2021[80]	NICU (1)	Neonatology	Nurses and palliative care social worker Postnatal 14 days after admission	- Validated screening tool - Clinician education - Leadership buy-in and reminders to frontline - Introducing PMADs screening during the admission process - Nurse and provider champion - Decision aid-algorithm and protocol - Notification of results to the team via a chat box - Referral resources - Parent education - In-house support groups	0	66	100/93
Cherry 2016[81]	NICU (1)	Neonatology	Nurse coordinator Postnatal 14 days after delivery	- Validated screening tool - Clinician education - Parent education material - Dedicated personnel - Referral process - Release forms for closed-loop communication the parent's primary care provider	0	48.5	36
Grunberg 2022[82]	NICU (1)	Neonatology	Psychology, postdoctoral fellow, and psychiatrist Postnatal 5–14 days after admission	- Validated screening tool - Dedicated in-person team - Referral process for positive screen with an in-depth clinical interview	0	22–39	Not reported
Moreyra 2021[83]	NICU (1)	Neonatology	Psychology doctoral student and social worker Postnatal starting 14 days after admission	- Validated screening tools in English and Spanish - Automated email with scores from electronic screening - Dedicated team of social workers, psychology fellow, psychologist, and psychiatrist - Scripts to introduce screening to parents - In-house referral system for positive screens - Clinical interview and risk	0	95	27

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Table 2 (*continued*)

Authors	Setting (n)	Discipline	Person administering screen/Timing	Interventions	Baseline screening rate	Screening rate after intervention (%)	Referrals /treatment improvement (%)
Torti 2023[84]	Maternity care centers (66)	Obstetrics	Nurses, chaplains, social workers Before discharge	assessment for those endorsing suicidal ideation - EHR documentation - Clinician education - Screening tool in multiple languages (paper) - Provider notification of positive screen - Referral algorithm and community resource list - Patient education literature distributed both inpatient and to the community - Electronic dashboard for bundle audit	76	92–97	Same due to all or none bundle compliance measurement

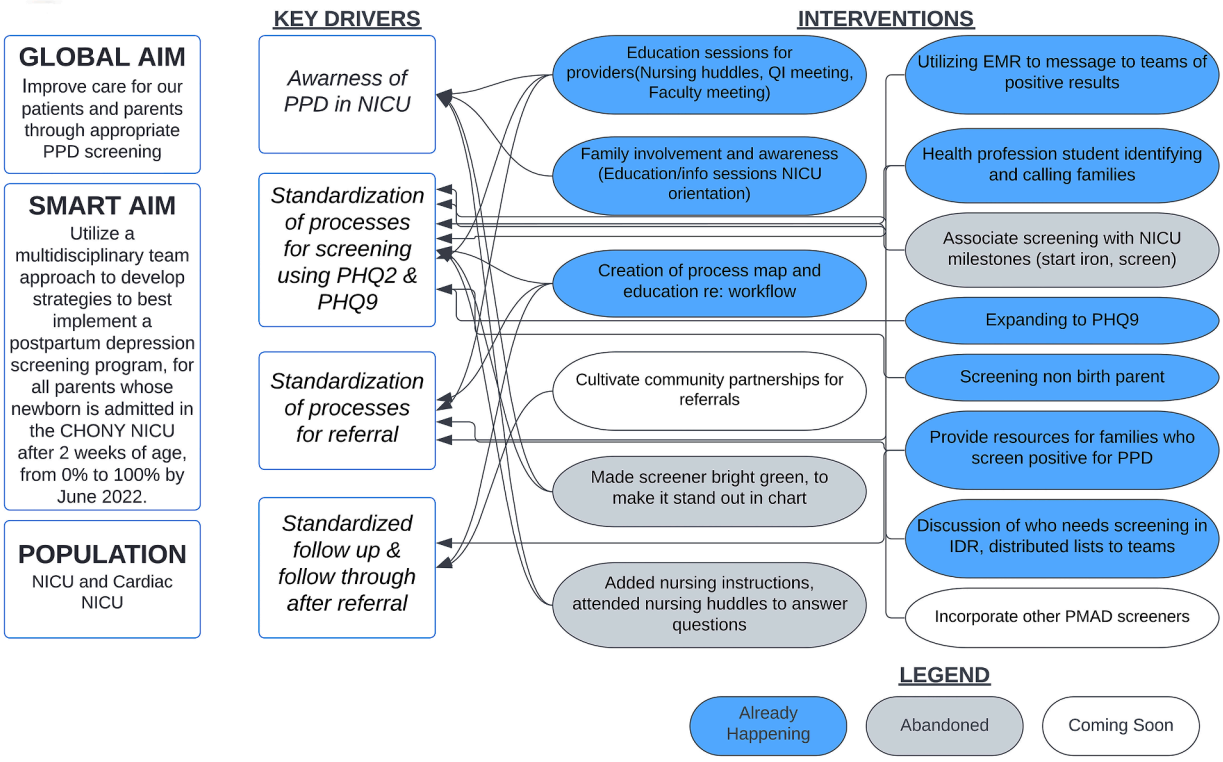

Fig. 2. Key Driver Diagram for improving PMADs screening in the NICU. Reproduced with Permission from Brady et al.[78] and Pediatric Quality and Safety©.

integration program that serves as a blueprint for other state programs (e.g., the Florida Behavioral Health IMPACT (Improving Maternal and Pediatric Access, Care and Treatment for Behavioral Health) program[86] and Texas' Perinatal Psychiatric Access Network (PeriPAN)).[87] With support from legislation, MCPAP for Moms was developed based on the original MCPAP, an effective, low-cost, population-based, integrated model for delivering psychiatric care in pediatric settings. MCPAP for Moms has 3 prongs: (1) Care coordination via a team of four staff members. The coordinators run a centralized call-in center for women who require linkage to care such as psychotherapy and support group resources. A directory of providers accepting referrals was developed and available to enrolled practices. Independent contractors run the directory and support groups. Follow-up calls are made one month after mental health care is provided, to ensure that all parent needs have been met; (2) Clinician training and toolkits for obstetricians and psychiatrists such as written information packets, a newsletter, presentations, training sessions, and in-person clinic meetings, and (3) Psychiatry consultation support via phone while the patient is still in the office or a one-time in-person patient outpatient consultation. Three teams were created within psychiatry departments at academic medical centers to receive referrals and were reimbursed for indirect and direct expenses. The total operating cost of the program, excluding start-up administrative expenses and community capacity building, was $8.38 per pregnant patient per year at the time of the publication. MCPAP for Moms trained 70 % of Massachusetts' obstetric providers to screen and manage perinatal mental health disorders and substance abuse.

General QI strategies to improve screening, referral, and treatment of PMADs

While each of the published QI reports used slightly different processes and interventions, at their core, they each focused on screening,

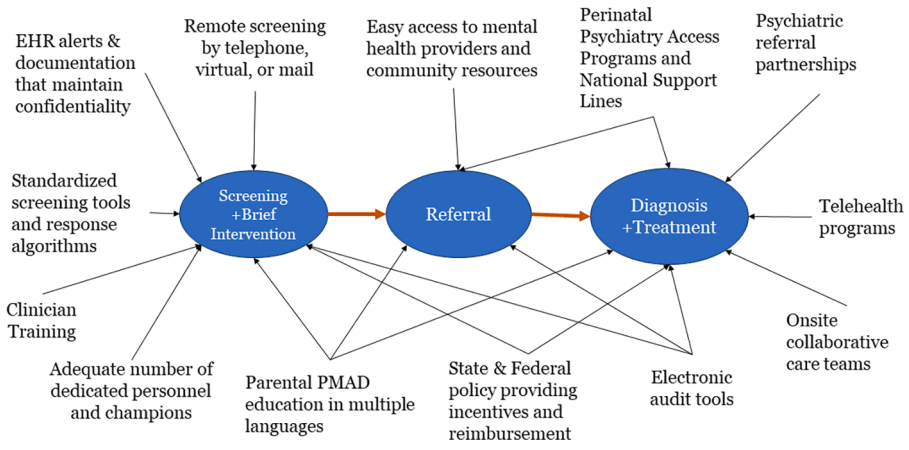

Fig. 3. Proposed process and strategies for recognizing, referring, and treating PMADs. .[90]

diagnosis, referral, and treatment in some way (Fig. 1). Given the importance of each aspect of this process, we encourage individuals and teams interested in addressing PMADs to look for the interventions that work best for their system. The psychological model of Screening, Brief Intervention, and Referral to Treatment "SBIRT" can be used.[88] Although primarily used in the care of birthing individuals with substance use disorders, it can also be applied in the context of PMADs and there is evidence supporting its effectiveness. Screening allows for quick assessment; brief intervention allows for initiation of treatment to mitigate complications, and referral to treatment allows for sustained ongoing care.[89] Strategies have been described (Fig. 3) to support reliable implementation of the "SBIRT" approach across a range of settings.

Key elements of a successful QI approach to improve any of the aspects in the process of PMADs or to support the implementation of SBIRT include:

Screening: Implementing universal screening for parents as part of the standard of care is the pivotal first step in identifying needs and improving parental mental health. Screening should occur in all settings where parents are present, including inpatient settings such as the NICU. Incorporating routine screening in these practice settings requires process improvement, algorithmic decision support, linkage to therapy for those with positive screens, and a collaborative care approach to ensure initiation and continuation of therapy. Steps for implementation of a reliable screening process include:

- Selection of a validated screening tool and appropriate timing for screening: Relying on clinical suspicion and parent self-report alone is a poor way to detect PMADs. For this reason, ACOG recommends all individuals receiving prenatal and postpartum care undergo screening for PMADs twice during pregnancy (initial prenatal visit and in the 3rd trimester), and at postpartum visits using validated instruments such as the EPDS, the PHQ-9, and the GAD-7 (Generalized Anxiety Disorder-7) questionnaire.[32] Similarly, the AAP recommends screening at the 1-, 2-, 4- and 6-month well-baby visits.[7] For parents of hospitalized infants, the AAP recommends screening during infant hospitalization[91] and screening during pediatric emergency department visits.[92] This allows parents multiple opportunities for detection and builds trust between parents and providers, an important relationship for disclosing their mental health needs. The application of universal screening also has the potential to address stigma and bias towards those with mental health disorders, a barrier that prevents patient transparency.
- Clinician education and training on the clinical significance of PMADs, how to introduce the screening instrument and score it, and ways to document findings are critical. In-person informational sessions were by far the most utilized modality (Tables 1 and 2). Toolkits, virtual sessions, or recorded videos were other modalities.

Brief Intervention and Referral to Treatment: For patients who screen positive, clinical decision supports or pathways should be developed to ensure patients are connected to care. Additionally, a response algorithm is always needed for mental health emergencies. Most programs mentioned either developed their list of providers accepting referrals, utilized publicly available lists, or developed a referral mechanism to a regional mental health clinic or program. To improve referral to treatment, collaborative care approaches in which mental health providers are co-located within practices or are integrated within obstetric, neonatal, and pediatric sites can be applied in both inpatient and outpatient settings.[93] It is important to note that there was wide variability in the approach to referral for treatment across the QI reports (Tables 1 and 2). Many of the QI efforts considered an approach by a social worker as a referral. There were also many differences in the situations and scores that would trigger a referral. As such, it is critical for a successful QI initiative to clearly specify and standardize operational definitions for 'referral' and 'treatment.'

Diagnosis and treatment: A full review of the treatment options for PMADs is beyond the scope of this review. However, it is important to note that there are several well-accepted and evidence-based non-pharmacological treatments for PMADs. These include cognitive behavior therapy (CBT), mindfulness-based CBT, and interpersonal psychotherapy (IPT).[94] Treatment is best offered in the context of an interdisciplinary team as well as a treatment setting that encourages and facilitates behavioral and emotional support for the parent while at the same time enhancing the relationship with the child.[95] It is important to provide interventions that limit parent separation from immediate family as well as provide developmental care interventions that focus on the parent-infant relationship and fostering positive parenting behaviors. QI reports specifically addressing the process of timely and reliable diagnosis and treatment for PMADs are generally lacking in the published literature. One study by Pawar et al. (2019) ,[96] looked at the impact of adding a psychologist in a perinatal psychiatric clinic and showed increases in the number of patients treated (30 %), the number of new and established visits (20 %), a decrease to the mean wait time for a new visit to 14 days and a decrease in the percentage of no-shows for established patients. There were improvements in efficacy, timeliness, and patient-centered care by having co-located care. The authors advocate for the integration of psychologists within such clinics, given the national shortage of psychiatrists. Similarly, Avalos et al.[57] showed an increase in depression remission, and Miller et al.[97] reported an increase in those entering treatment when frontline clinicians performed an onsite assessment. More research and QI efforts are needed to support best practices and practical approaches to facilitating diagnosis and treatment in perinatal care settings particularly for underserved populations.

Parent education material: To improve understanding as well as

self-recognition of symptoms, all parents should be educated on the general signs and symptoms of PMADs. ACOG and the Association of Women's Health, Obstetric and Neonatal Nurses advocate for all individuals giving birth to be educated on the POST-BIRTH warning signs before discharge from the hospital, which includes "thoughts of hurting yourself or someone else".[98] To ensure equity, healthcare providers should ensure that parental education materials are culturally and linguistically appropriate for their patient population, as well as appropriate for all levels of healthcare literacy.

Designated Staff: Successful studies had a designated staff member overseeing screening, referral, and auditing. In addition to being a commonality among successful QI initiatives, it is also a recommendation of the AAP.[7]

Measurement: As part of QI, measuring outcomes is key to improvement. QI teams can take advantage of publicly reported measures. For example, prenatal and postnatal screening for PPD are already Healthcare Effectiveness Data and Information Set (HEDIS) measures[99] used by > 90 % of U.S. health plans. The National Committee for Quality Assurance has endorsed 4 measures, including the percentage of deliveries screened for PMADs and the percentage of follow-up visits within 30 days after a positive screen (both pre- and post-natal).[93] In addition to publicly reported and endorsed measures, commonly measured outcomes across QI initiatives include screening rates, positive screens, and referral rates.[77] Automated data capture that fits workflow will enhance the monitoring and reporting of outcomes, as shown by healthcare systems having integrated EHR across inpatient and outpatient settings.[93] Data for treatment rates are more elusive.

Ensuring an equity lens

It is important to address disparities, biases, and cultural stigma associated with perinatal mental health disorders. Training providers and funding programs that are culturally congruent and culturally sensitive could ensure better follow-through on the completion of screening, referral to appropriate therapies, and completion of therapy. Utilizing rational subgrouping of control charts of outcome measures by race and ethnicity can highlight areas of greatest disparities as a start. Access to care for women with PMADs identified as needing intervention is limited, particularly for those in rural areas. Challenges in accessing perinatal mental health include not only the lack of consistent screening and diagnosis but also a lack of specialized community providers. Technology-based approaches, sometimes referred to as mobile health (mHealth) technologies, that have increased significantly following the COVID-19 pandemic, have shown promise in helping provide women with more access to care in these circumstances.[100,101] For women with perinatal symptoms of anxiety and depression, mHealth has been utilized in the form of web-based support groups and mobile apps to provide psychoeducation about PMADs.[102] These interventions are effective in helping relieve mild symptoms of psychological distress including symptoms of depression.

Conclusion

Despite strong evidence supporting the benefits of screening and early intervention for PMADs, the mental health needs of a vast majority of parents are not routinely addressed, particularly outside of prenatal screening. While barriers exist including lack of funding for mental health services and insufficient numbers of perinatal mental health providers and services more broadly, there is a large body of published QI reports demonstrating success with improving screening, referral, and treatment for PMADs. Implementation of these programs requires both education and advocacy to help healthcare organizations realize the benefits as well as the costs of the failure to offer mental health services, not only for parental mental health but also for infant developmental and mental health outcomes. The recent federal mandate to implement suicide screening for children in pediatric hospitals may provide a model of how obstetricians, pediatricians, and neonatologists might mobilize similar resources and support for parents. In addition, advances in mHealth including the use of telehealth and digital applications and newer models of postpartum health care delivery (e.g., use of home health visits and community health workers) may address some of the current implementation barriers. Addressing PMADs also means improving the social support structure surrounding parents during and after pregnancy. Improving social support should include more liberal maternity leave policies and the expansion of Medicaid to include the first year postpartum to allow high-risk parents with low income more access to mental healthcare. Regardless of the practice setting or the provider type, several groups have shown us that improving perinatal mental health is within reach. Key strategies to consider for those with QI focus are listed in Table 3. We recommend starting small and performing small tests of change, and keeping in mind that the common denominator in all initiatives presented in this article is the combination of multidisciplinary teamwork and ownership.

Table 3
Key factors to consider for those embarking on systemic change in PMADs programs through QI. EHR, Electronic Health Record.

	Tips
Define measures	Outcome measures: •% of parents whose PMADs improved Process measures: •% of eligible parents screened •% of eligible parents referred for treatment after a positive screen •% of eligible parents who received treatment (therapy or medication). Balancing measures: • Clinician satisfaction • Time spent screening or spent per client
Identify and engage of key stakeholders	Frontline clinicians, office staff, clinic staff, hospital leadership, and administrators
Standardize processes and automate	• EHR System for data collection and analysis • Clinical dashboards for real-time response • Tracking of repeated patient-reported outcomes • Monitoring for parents who at risk of non-compliance with visits or medications. • EHR reminders and smart phrases
Join quality collaboratives and access programs	• Benchmark with peers • Utilize ready-to-use educational toolkits • Perinatal mental health access projects for parents and providers
Select appropriate screening tools and developing decision aids	• Shorter screening tools may miss parents who are positive but may also increase screening capacity • Clear algorithms in response to positive scores • Perinatal access programs for parents and providers
Focus on equity and access	• Culturally congruent and culturally sensitive programs • Rational subgrouping of control charts of measures by race and ethnicity • Remote telehealth programs

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