Review Article

Managing Perinatal Depression through Collaborative Care Models in Obstetric and Pediatric Settings: A Systematic Review

Idan Falek[1]*, Sanjana Manjunath[1], Mary Acri[1], Nicole Davies[1], Joanna Dominguez[1], Sarah Sisco[2], Mary McCord[3], Wendy Wilcox[4], and Katherine Piwnica-Worms[2]

[1]Department of Child & Adolescent Psychiatry, NYU School of Medicine, New York, United States
[2]NYC Health + Hospitals, Office of Ambulatory Care and Population Health, New York, United States
[3]NYC Health + Hospitals/Gotham Health, New York, United States
[4]NYC Health + Hospitals/Kings County, New York, United States

Abstract

Collaborative care models (CCMs) are effective in managing depression in primary care settings. However, it is unclear as to whether collaborative care models implemented in women's health and pediatric settings are enhancing treatment for women who are at risk of perinatal depression. This review examined literature about collaborative care models for women in the perinatal period to provide insight into the promising treatment model. A systematic search resulted in n=8 studies that evaluated a total of n=7 different CCMs. Depression screening, referral processes, care coordination, treatment, and other aspects of the CCMs were examined. It can be concluded that CCMs enhance the detection of depression, treatment initiation, and engagement in services in pregnant and postpartum women. Implications and a future research agenda are presented.

Keywords: Collaborative Care Model; Perinatal Depression; Care Coordination; Women's Health; Pediatrics; Mental Health Services

*Correspondence to: Idan Falek, Department of Child & Adolescent Psychiatry, NYU School of Medicine, New York, United States; Tel: 646.754.5075; Fax: 212.263.3691; E-mail: idan.falek@nyu.edu

Introduction

Approximately 10% of women experience depression during their lifetime [1,2]. The perinatal period, which encompasses the time from pregnancy until one year postpartum, is one of the most vulnerable times for the onset of depression for women [3-6]. Prevalence rates during pregnancy are as high as 12.8% [7], while rates of postpartum depression range from 10% to 15% [8,9]. These statistics suggest that a significant number of women are burdened with symptoms of depression during a pivotal period for their children and themselves.

The costs associated with untreated perinatal depression (PND) are substantial. In addition to being one of the leading causes of disability amongst women and an accelerant to poor health and premature mortality [10-12], infants born to women experiencing depression have a heightened risk for reduced growth in the womb, low birth weight, and premature delivery, which are leading causes of child morbidity and mortality [5]. Further, infants of mothers with depression demonstrate sleep difficulties, fussiness and bonding difficulties, a difficult temperament, cognitive impairment, behavior problems, and heightened anger [13-16].

Caregiver depression also affects the quality of parenting, negatively impacting parental involvement and warmth, which enhances the risk of child maltreatment [17,18].

Additionally, the chronicity associated with untreated depression makes additional episodes throughout a child's development likely, impacting academic performance, cognitive functioning, behavior, and peer-relationships throughout childhood and adolescence [19-21]. However, when maternal depression remits, multiple youth and family outcomes improve [22-24]. A seminal national study conducted by Weissman MM, et al. (2006) [24], in which 150 mother/child dyads were followed longitudinally, found significant reductions in child mental health symptoms and diagnoses among mothers who evidenced remission in depression. A follow-up study one year later found that children of mothers who experienced a remittance of depression within the first three months of treatment or over the one-year follow-up period had a significant reduction in mental health symptoms in comparison to children of mothers who continued to experience depression [25].

Although the burden of depression is high, few women are identified or receive treatment during the perinatal period. A recent analysis of the National Survey on Drug Use and Health that surveyed

128,000 participants, found pregnant women were statistically less likely to receive treatment for depression than women who were not pregnant [26]. A second study involving over 3,000 pregnant women screened for depression in OBGYN settings found 20% met criteria for depression, yet only 13.8% of those with depression had received treatment [27]. Reports by mothers confirm that very few initiate treatment on their own due to logistical obstacles (e.g., cost, lack of transportation and childcare, competing demands), lack of knowledge about mental health and treatment, low empowerment and activation to seek services, and perceptual factors including stigma, mistrust of providers and treatment, and fears of losing custody of their children or being viewed as a bad parent if they are depressed or seek care [28-30].

Addressing perinatal depression within health settings that women frequent for themselves (obstetrics), or their child (pediatrics) has been proposed to increase detection of PND. National organizations such as the American Academy of Pediatrics (2021) [31], and the American College of Obstetricians and Gynecologists (2018) [32,33], for example, advise screening women at set intervals [34]. However, significant barriers to screening efforts have emerged; providers cite concerns about lacking the time, confidence, and knowledge about available mental health resources to refer caregivers to [4,35-40]. Consequently, most women with perinatal depression are not identified through screening alone and detection rates for perinatal depression in obstetrics settings are low; in one study, for example, only 26% of 387 pregnant women who met criteria for depression or anxiety were identified by their obstetrics provider as having a mental health problem [41].

Collaborative care models (CCMs) are considered the gold standard to manage depression in primary care settings [42]. Models vary, but at a minimum require the collaboration of healthcare providers and psychiatric and care management staff to provide services and monitor engagement and treatment response [43]. For instance, the American Psychiatric Association (2021) [43], outlines a set of steps to CCMs, which includes shared goal-setting by a team of primary care and behavioral health providers, monitoring treatment goals using validated instruments, providing evidence-based treatment, and conducting outreach and tracking participants to monitor drop out and treatment non-response [42].

Research is fairly uniform in finding collaborative care models effective in treating depression in primary care populations, and often these benefits continue during follow-up [42-44]. Additionally, some studies suggest CCMs are a cost-effective alternative to usual care [45]. For women in the perinatal period, providing integrated and streamlined health and behavioral health services has the potential to capture women who would not typically intersect with the mental health service system, and potentially reduce barriers such as stigma, mistrust of mental health services, and logistical obstacles to care [42-44]. While adult primary care settings benefit from CCMs, it is unclear if this benefit also translates to the women's health and pediatric settings for women in the perinatal period. This systematic review intends to synthesize the literature about collaborative care models for women during the perinatal period in order to provide insight into this promising treatment model and its impact in addressing depression during this particularly vulnerable period in the female lifespan [46]. We were guided by the following research questions:

- What is the prevalence of published CCMs for women during the perinatal period?
- How are collaborative care models implemented in pediatric and obstetric settings, what are their components and whom guides their delivery, and
- What is the current state of the evidence about their effectiveness for identifying women at risk for depression, facilitating engagement in services, and depressive symptoms?

Methods

A systematic review of collaborative care models for the management of perinatal depression was conducted. Consistent with the methodological approach undertaken in our previous reviews [47-50], the first author (Idan Falek) developed a list of search keywords and terms from the literature. Because this was an exploratory study and in order to not be overly restrictive, two broad categories were created:

- Perinatal period (pregnancy, postpartum) and
- Collaborative care model.

Search terms within the perinatal period category were linked with "or," and the perinatal period and collaborative care model categories were linked with "and" to capture studies that included at least one search term from both the first and second categories. The search was executed using the search engines PsycINFO, PubMed, and Web of Science through a university library system. Because search engines vary with respect to their search limits (e.g., different classification groupings), database search limits were restricted to year (1980-2021), and language (English).

Inclusion and Exclusion Criteria

Studies of collaborative care models were included if they:

1. Had been published (as journal articles or chapters) between 1980 and 2021,

2. Were delivered in obstetric or pediatric settings,

3. Were intended for women in the perinatal period,

4. Examined outcomes related to mental health, and,

5. Had published data.

Analysis

Results from the electronic search were reviewed by three of the co-authors (Idan Falek, Mary Acri, Joanna Dominguez) for eligibility based upon the inclusion and exclusion criteria listed above. Any questions in inclusion were discussed during biweekly meetings until consensus was met. Once an initial list of studies was compiled, full-text articles were retrieved and again divided amongst the three co-authors. Confirming and finalizing their inclusion status followed the same process. Simultaneously, a coding scheme was developed (e.g., sample characteristics, program description and control or comparison conditions, and outcomes) to describe the programmatic components across studies.

Results

The initial search generated 408 citations; after removing duplicates, 367 citations were screened for eligibility. All but 67 citations were excluded from the full-text review because they fell outside of the inclusion criteria. Of the 67 full-text articles, 61 were subsequently excluded because the participants were not in the perinatal period or the intervention did not focus on outcomes related to mental health,

resulting in six articles that described five models that were included from this search. Consultation with experts in the field resulted in two additional studies, for a total of eight articles describing seven models. See Figure 1 for a detailed search history. [Insert Figure 1 here]

Study and Model Overview

Studies were published between 2009 and 2018; of these, three studies (38%) focused only on postpartum women, two studies (25%) focused on both pregnant and postpartum women, and one study (13%) focused on pregnant women only. The final two studies examined the same CCM; one study targeted pregnant women only, while the second study targeted both pregnant and postpartum women.

Slightly over half of the models (n=4, 57%) were implemented in obstetric care settings, followed by two models (29%) that were delivered in pediatric settings and one model (14%) that was located both in pediatric and obstetric care settings. The explicit purpose of three models (n=3, 43%) was to improve care and address low detection and service utilization. The purpose of two models (29%) was to improve depressive symptoms. One model (14%) had two goals:

- To improve care by decreasing the time from referral to evaluation and
- To decrease depressive symptoms. The remaining model's purpose was to address the psychosocial needs of mothers disadvantaged by poverty.

Model Description

All seven models (100%) followed a similar structure beginning with screening the participant for mental health concerns. This was followed by connecting the participant to a care manager who helped identify relevant resources, services, and treatment for the participant while also providing decision support and behavioral health consultation. Then, the health team would follow-up to monitor treatment and changes in mental health outcomes in the participant. The specific steps for CCMs are as follows:

Screening for Depression

All of the models (n=7, 100%) included a screening component and employed a standardized screening instrument. Most commonly (n=5, 71%), the Edinburgh Postnatal Depression Scale (EPDS) was utilized, which is specifically designed to detect depressive symptoms during the perinatal period [51]. The next most common (n=4, 57%) screening instrument was the nine-item Patient Health Questionnaire (PHQ-9), which is used to monitor the severity of depression and response to treatment in all primary care settings [52,53]. N=1 (14%) of models used the depression module of the SCID-IV interview, which is administered to systematically evaluate major axis disorder in the DSM [54].

Over half of the models (n=4, 57%) used multiple instruments in combination. For example, the EPDS was completed first in the Translating Research into Practice for Postpartum Depression effectiveness study (TRIPPD), and if the participant scored greater than nine, the PHQ-9 was then administered [55]. Similarly, the stepped care treatment of postpartum depression model administered the SCID-IV if a woman had a positive PHQ-2 or PHQ-9 [56].

Screenings were either conducted by care managers (n=2, 29%; e.g., nurse practitioner and registered nurse), primary care providers (n=1, 14%), or were self-administered (n=3, 43%). N=1 (14%) model

did not describe how the screenings were administered. In the TRIPPD effectiveness study model, the initial EPDS screener was self-administered, and the following PHQ-9 was administered by the provider [55]. Patients across all models (n=7, 100%) who met or exceeded the screening cutoff from either one or multiple screenings were connected to care management services.

Care Coordination

Care coordination was done by care managers defined as nurses (n=2, 29%) or a nurse practitioner (n=1, 14%), staff with unspecified education/experience (n=2, 29%), a depression care manager (n=1, 14%) who was either a nurse care manager or a social worker, or a mental health advisor (n=1, 14%) from a variety of behavioral health trained disciplines, including social work, marriage and family therapy, nursing, and clinical psychology. Some responsibilities of care managers involved conducting an evaluation through the screening instruments mentioned above to confirm diagnosis either initially or during follow-ups (n=5, 71%), provide referrals to address psychosocial needs such as housing, food, social support, or domestic violence services (n=4, 57%), provide psychoeducation about depression (n=3, 43%), and provide evidence-based counseling or psychotherapy (n=2, 29%). For example, Connelly CD, et al. (2010) [57], described the care managers role to include encouraging mothers to seek social support, providing information about evidence-based intervention options (medication, psychotherapy, exercise), assisting with navigating the healthcare system (explaining types of services and providers), and assessing access to treatment (addressing barriers to service receipt).

In addition to these roles, care managers in most models (n=5, 71%) were responsible for identifying the best course of treatment for the patient. For example, in the Depression Attention for Women Now (DAWN model) [58,59], the care manager discussed the patient's preferences for treatment with the options of either anti-depressant medications or Problem-Solving Treatment-Primary Care, a brief treatment that aims to develop skills to alleviate life events, stresses, or problems [60].

Across all seven models (100%), care managers were also responsible for care coordination and facilitating follow-up outreach with participants to assess treatment engagement (n=7, 100%), monitoring symptoms (n=1, 14%), or providing other supports (n=1, 14%). For example, Gjerdingen D, et al. (2009) [56], described the follow-up phone calls to include monitoring depressive symptoms using the PHQ-9, mental health visits, treatment adherence and side effects, social support, suicidal ideation/plans, and lifestyle issues including nutrition, exercise, and rest. The majority of models (n=4, 57%) specified that the frequency of follow-up was dependent on severity or patient's needs, while the remaining three models (43%) did not provide details on the frequency of follow-up.

Treatment

After the screening process and evaluation, treatment recommendations were advised by either the care managers (n=5, 71%), psychiatrist (n=1, 14%), or primary care provider (n=1, 14%). Treatment option across all of the models included evidence-based psychotherapy or antidepressants. Five of the models (71%) provided psychotherapy on site in the primary care setting, while the remaining two models (29%) provided referrals for psychotherapy in the community. By and large, studies did not provide details on the types of psychotherapy offered (n=6, 86%), except for the studies of the DAWN model [58,59], which provided Problem-Solving Therapy.

If provided on site, psychotherapy was provided on site by either care managers (n=2, 28%) or behavioral health staff (n=3, 43%).

Pharmacology, and specifically antidepressants were provided by the primary care provider, nurse practitioner or integrated behavioral health staff psychiatrist on site (n=4, 57%) or in one model, referred out to providers in the community (n=1, 14%) [60].

Reassessment and Monitoring of Depressive Symptoms

Most of the models (n=6, 86%) monitored depression symptoms frequently through the use of depression screeners administered by the care managers during follow-ups. Of the models that mentioned the reassessment of depression, n=2 (33%) mentioned the use of the PHQ-9 and n=1 (17%) used either the EPDS or the PHQ-9 for reassessment. While the frequency of the follow-up screenings was not explicitly mentioned by most of the studies (n=6, 100%), the TRIPPD model "repeatedly screened", and the model studied by Truitt FE, et al. (2013) [61], evaluated symptoms routinely with a psychiatrist reviewing the patient's care on a weekly basis.

Suicidality

Five models (71%) described the management of suicidal risk. Of these, four (n=4, 57%) identified suicidal risk by caregivers endorsing thoughts of self-harm on the screening instruments. The remaining model did not manage suicidal risk, but it defined participants with suicidal ideation as those who reported self-referring themselves to the emergency room [62]. Caregivers were referred to emergency mental health services. For example, Connelly CD, et al. (2010) [57], provided a direct referral line to the adult emergency screening unit in their area for an emergency mental health referral. Gjerdingen D, et al. (2009) [56], developed a plan of action that included informing the woman's provider and recommending an urgent visit to the primary care and/or mental health provider or emergency department. In the DAWN model, patients were stratified into risk tiers based on an assessment by the clinician, which included intent, access to firearms, current alcohol or drug use, and a history of patient suicide attempts, and escorted directly to the emergency department if indicated [58,59].

Outcomes Specific to Screening, Engagement, and Depression

Research designs employed to examine the seven models (one of which was examined in two studies) included three randomized controlled trials (38%), two single group pre/post designs without a comparison or control group (25%), two evaluation assessments (25%), and one retrospective chart review (13%).

Four studies investigated changes in depressive symptoms and treatment response (n=4, 50%), and another four examined engagement in mental health treatment (n=4, 50%). Additionally, two studies (n=2, 25%) examined referrals to off-site behavioral health psychiatric consultation for women who screened positive for depression; a final study examined screening rates (n=1, 13%).

Results from screening for depression were favorable as a whole. Specific to remittance of depression, Yawn BP, et al. (2012) [55], found a reduction in depression scores of five or more points from baseline to 6-12 months postpartum, which is considered to be indicative of clinical improvement, while results of Rock MM (2018) [62], showed participants evidenced a significant decrease in depression (prenatal) and a clinically significant reduction in depression amongst postpartum women. Further, DAWN participants evidenced greater improvements in depression at one year and 18-month follow-up and

functional improvement [59].

Additionally, results found superior rates of engagement. Gjerdingen D, et al. (2009) [56], for example, found 93.8% of women in the intervention condition were engaged in treatment versus 56% of women in the control group; while Yawn BP, et al. (2012) [55], found that women who were enrolled in the Translating Research into Practice for Postpartum Depression (TRIPPD) study were more likely to be referred to a psychiatric consult offsite and engaged in mental health treatment in comparison to the control group. See Table 1 for a breakdown of the studies and models. [Insert Table 1 here].

Discussion

The purpose of this review was to synthesize the evidence about collaborative care models in women's health and pediatrics settings to detect and address perinatal depression to enhance maternal and child outcomes. A total of seven models were examined through the analysis of eight different studies conducted between 2009 and 2018. These collaborative care models were: Allegheny County Maternal Depression Initiative [63], Perinatal Mental Health Model [57], Stepped Care Model [56], Depression Attention for Women Now [58,59], Collaborative Care Model [62], Translating Research into Practice for Postpartum [55], and one unspecified collaborative care model [61].

Results of this endeavor found that collectively, the models followed a stepwise progression from screening using standardized measures to the provision of treatment, with most models providing treatment in the health setting. Further, care managers played a large role in the patient's journey through care coordination, a central component of these models. Care managers' exact duties varied across models, but in most cases, they were responsible for discussing treatment options with patients, recommending, and referring appropriate treatment and services, and providing follow-up outreach to participants to assess their engagement in the treatment.

Examination of these studies revealed that only a minority of the reviewed studies utilized rigorous research designs, with the majority relying on pre/post designs, evaluations, and chart reviews. Outcomes focused primarily on the remittance of depression, engagement in mental health services, and screening rates, with favorable findings supporting CCMs for reducing symptoms, facilitating engagement in treatment, and increasing rates of screenings.

In order to discern the benefits of CCMs used during the perinatal period, more expansive studies with rigorous research designs such as RCTs must be conducted as they can provide clarity about the benefits of various components within the models. In addition to well-designed evaluations and studies of the CCMs, the field would also benefit from additional research in several related areas. First, while the preliminary focus across models was depression, it rarely occurs in isolation. For example, Dindo L, et al. (2017) [64], found that pregnant women with depression had higher rates of generalized anxiety disorder and post-traumatic stress disorder, while Figueira P, et al. (2009) [65], found a significant increase in comorbidities such as Generalized Anxiety Disorder, Obsessive Compulsive Disorder, Social Phobia and Agoraphobia in women with postpartum depression. A limited number of studies in this review focused on additional mental health factors, such as substance use, that could jeopardize both maternal and child mental and physical health. Future research exploring the use of CCMs to address social determinants of health or other mental health conditions can help support evidence-based care for families with a larger variety and range of needs. Relatedly, given the detrimental effects

of unidentified/untreated depression on child health and development, future research that examines the effect of collaborative care models for perinatal depression on birth outcomes and more distally the child's health and development are imperative to support the integration of CCMs in other perinatal and pediatric settings.

Secondly, this review suggests a need for greater specificity regarding the type of treatment provided to women at risk to contextualize study findings. While the studies mentioned that the patients had the option of antidepressant medication or psychotherapy, the specifics of the treatments were not clearly mentioned, with the exception of the DAWN model, which utilized Problem Solving Therapy-Primary Care. There are many other evidence-based therapy treatments for perinatal depression such as Cognitive Behavioral Therapy (CBT) and Interpersonal Therapy (IPT) [66]. Studies need to employ more specificity when reporting the type of psychotherapy treatment used in their CCM in order to better understand the findings. When it comes to antidepressant medication, there is a lot of controversy surrounding its use during the perinatal period - women are usually advised to decrease or discontinue their medication [67], while other studies have determined that antidepressants are not correlated with birth complications [68] nor with poor development in children [69]. Understanding more about the type of antidepressants given to patients would help contextualize findings and provide more clarity regarding antidepressants as a treatment option.

Third, although economic studies demonstrate that CCMs are more cost-effective long-term on the health care system than care as usual [43,70, and 71], CCMs require higher start-up costs. For example, Gilbody S, et al. (2006) [72], found consistent evidence that CCMs resulted in improved outcomes but were associated with greater costs initially. Similarly, Glied S, et al. (2010) [73], found that interventions that provide training to primary care teams in managing depression produce net benefits, with more costly interventions of this type generating more considerable net benefits than less costly interventions. Consequently, examining cost-saving approaches may potentially benefit other systems of care that are otherwise unable to fund collaborative care models. For example, the use of trained lay persons or peers has grown in popularity, particularly as patient navigators for individuals with cancer [74]. These types of peer-delivered services help address health care disparities by engaging patients and providing them with access to treatment and services which allows people to make a plan regarding their health and wellness [75]. Researchers agree that the cost benefits of such peer-delivered services must be evaluated via controlled research in larger samples [76].

Finally, there is a gap in the literature that focuses on male caregivers. An increasing number of women are entering the workforce, and there is greater diversity in familial configurations, such as a more significant number of stay-at-home fathers [77]. Due in part to this, the role of male caregivers has been reconceptualized from one of primarily providing financial support to taking an active role in childrearing [78]. Thus, attention has shifted to the involvement of fathers in child-serving systems. Research shows that paternal involvement has been linked to positive child mental and medical health outcomes from pregnancy to childhood that persists through adulthood sher positive factors of this involvement include favorable outcomes in young children regarding academic achievement, behavior, and cognitive development [79]. Specifically, during the prenatal period, paternal involvement was associated with increased use of early prenatal care and reduced smoking and alcohol consumption in pregnant women [80]. Additionally, an absence of paternal presence during the birthing

process is associated with increased infant mortality rates and preterm births in addition to low birth weights [81]. Furthermore, another benefit of paternal involvement is that when the mother's ability to parent is impaired, fathers tend to function as a buffer between negative maternal behaviors and potential negative impacts on child outcomes [48,79].

In sum, based on the current state of the evidence, CCMs show great promise for treating perinatal depression. There is a need for expansive, rigorous research designs that evaluate outcomes beyond engagement and screening rates such as birth trajectories and child development [80-86]. Additionally, there remains a lack of literature covering the use of CCMs to address depression comorbidities, cost benefits of such care models, and the impact of paternal involvement on health outcomes. By delving into these areas, the benefits of CCM can be better understood and its use can be prioritized in perinatal and pediatric health care settings [87-90].

Limitations

This study has several limitations to be noted. The grey literature was not reviewed, indicating that there may be additional CCMs aimed at addressing mental health outcomes for pregnant and postpartum women that may not have been considered. Another limitation is the lack of publications around CCMs for women in the perinatal period. These models are likely being implemented but are not rigorously studied. Given the importance of mental health in maternal and child outcomes, this is a crucial area of research that requires additional funding to support evaluation efforts and publications.

Conclusion

In sum, the review highlights collaborative care models as potentially effective for enhancing detection, treatment initiation, and engagement in mental health services among pregnant and postpartum women at risk for depression. While understanding the caregiver's engagement with the intervention is important, future studies must explore various services and treatments of the collaborative care model and their effects on depression severity, remission, and the long-term generational impact on the mother and child. Although they lacked specificity around treatment type, the models used rigorous screening tools to aid in detection. Additional research is vital as there is a lack of development of the models and a lack of rigorous randomized controlled trials. With additional funding to aid both the implementation and research of these models, there is great potential to alleviate mental health concerns for women in the perinatal period and their broader effects on families.

Acknowledgements

Declaration of Interest

The authors declare that they have no conflict of interest.

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