Published in final edited form as:

J Psychosom Obstet Gynaecol. 2018 December ; 39(4): 273–280. doi:10.1080/0167482X.2017.1367381.

Delivering perinatal depression care in a rural obstetric setting: a mixed methods study of feasibility, acceptability and effectiveness.

Amritha Bhat, MBBS, MD¹, Susan Reed, MD,MPH², Johnny Mao, MPH¹, Mindy Vredevoogd, MS¹, Joan Russo, PhD¹, Jennifer Unger, MD, MPH², Roger Rowles, MD^{1,3}, and Jürgen Unützer, MD, MPH, MA¹

¹Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, WA

²Department of Obstetrics and Gynecology, University of Washington, Seattle, WA

³Generations Obstetrics and Gynecology, Yakima, WA

Abstract

Objectives: Universal screening for depression during pregnancy and postpartum is recommended, yet mental health treatment and follow up rates among screen positive women in rural settings are low. We studied the feasibility, acceptability and effectiveness of perinatal depression treatment integrated into a rural obstetric setting.

Methods: We conducted an open treatment study of a screening and intervention program modified from the Depression Attention for Women Now (DAWN) Collaborative Care model in a rural obstetric clinic. Depression screen positive pregnant and postpartum women received Problem Solving Therapy (PST) with or without antidepressants. A care manager coordinated communication between patient, obstetrician and psychiatric consultant. We measured change in the Patient Health Questionnaire 9 (PHQ –9) score. We used surveys and focus groups to measure patient and provider satisfaction and analyzed focus groups using qualitative analysis.

Results: The intervention was well accepted by providers and patients, based on survey and focus group data. Feasibility was also evidenced by recruitment (87.1%) and retention (92.6%) rates and depression outcomes (64% with >50% improvement in PHQ 9) which were comparable to clinical trials in similar urban populations.

Conclusions for practice: DAWN Collaborative Care modified for treatment of perinatal depression in a rural obstetric setting is feasible and acceptable. Behavioral health services integrated into rural obstetric settings could improve care for perinatal depression.

Keywords

Perinatal depression; collaborative care; obstetric clinic; rural

Corresponding author: Amritha Bhat, MBBS, MD, 1959, NE Pacific Street, Box 356560 Seattle, WA 98195-6560, amritha@uw.edu, Phone: 206.543.3117 | Fax: 206.221.7184.

Disclosure of interest: The authors have no conflict of interest to disclose.

Ethical approval: All procedures were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Introduction

Perinatal depression is prevalent in primary care and obstetric settings, affecting 10 to 20% of women [1, 2] and is associated with adverse outcomes for women [3], families [4, 5, 6] and children [7, 8]. Given this high prevalence and the burden of untreated perinatal depression, the American Congress of Obstetricians and Gynecologists – ACOG[9] and United States Preventive Services Task Force – USPSTF [10] recommend universal screening for perinatal depression (at least once during pregnancy and postpartum). Yet even with wider implementation of depression screening, only 22% of women who screen positive complete a mental health referral [11]. Integrating behavioral treatments into obstetric settings is one way of improving access to care, especially in rural settings where disparities in mental health care access are high [12], and detection and treatment rates for perinatal depression are low [13]. Collaborative Care is one of the most evidence based models of care involving integration of mental health care into general medical settings [14]. A recent review showed that Collaborative Care models are well suited to treating depressed women in non-mental health settings [15]. Specifically, data suggests that this model of care can be applied to obstetrics – gynecology settings [16] and to perinatal populations in primary care settings [17]. However, there are unique barriers to treatment during pregnancy and postpartum (decisions regarding antidepressant treatment, child care, lack of time and stigma) [18]. Similarly, access to mental health care in rural settings may be limited due to increased travel times, additional stigma due to lack of anonymity, and cultural factors [19, 20]. To our knowledge there has been no report of the feasibility of Collaborative Care delivered in a rural obstetric clinic.

Collaborative Care is team based, patient centered care most commonly delivered in primary care settings. Patients are offered evidence - based treatment for depression by care managers (CMs) trained in behavioral interventions, such as problem solving therapy (PST) [21] or interpersonal therapy (IPT) [22], under the supervision of a psychiatric consultant. The consultant oversees the care of the patient and makes recommendations to the patient's primary prescriber for psychotropic medications. CMs coordinate all communications. We modified the Depression Attention for Women Now (DAWN) Collaborative Care intervention [23] for use in a rural perinatal population by including enhancements such as text messaging and CM home visits. We measured feasibility (consent rate, retention rates), acceptability (provider and patient perceptions) [24] and depression outcomes using descriptive statistics, and patient and provider surveys and focus groups. We predicted that delivering Collaborative Care for perinatal depression in a rural obstetric clinic would result in rates of recruitment and retention and reductions in depressive symptoms comparable to those in clinical trials of Collaborative Care for women [16]. We conducted focus groups with patients and with care managers to obtain qualitative data on acceptability.

Methods

Study design and setting

We conducted an open treatment study in an obstetrics and gynecology clinic in rural Washington, October 2015 through March 2016. The clinic serves ethnically diverse women

(48% Hispanic, 44% Non-Hispanic White, 5% Native American, and 3% other) of all ages, with either public or private insurance (44% Medicaid eligible). In October 2015, based on recent recommendations calling for universal depression screening in the perinatal period, the clinic began administering the Patient Health Questionnaire-9 (PHQ-9) [25] to all pregnant and postpartum (within 1 year of delivery) women or those planning pregnancy. Women were approached to participate in the modified DAWN Collaborative Care intervention [23] if they screened positive for depression, spoke English, and were 18 years and older. A medical assistant introduced the Collaborative Care model. If the patient expressed interest, the CMs, two registered nurses and a counselor, called them within two business days to schedule an intake. If not, women were instructed to follow up with specialist mental health providers for assessment and treatment. The Institutional Review Board at the University of Washington approved the study.

Study subjects

Women who provided written informed consent were enrolled if their PHQ-9 score was 10 or greater. The PHQ-9 has established reliability and validity in various populations including pregnant and postpartum women [26]. Recruitment proceeded for 3 months, until 27 patients began treatment.

Intervention

The rural obstetric clinic administered the DAWN Collaborative Care intervention, with modifications such as home visits by the CM and text messaging. CMs were trained in an engagement session, PST, text messaging protocols and general information on perinatal mental health and pharmacotherapy. Encounters occurred in the clinic or in the patient's home. The first encounter was an engagement interview [27], designed to address practical, psychological and cultural barriers to care. Subsequent sessions were six to eight weekly sessions of PST if chosen by the patient. Between sessions, CMs communicated with patients via text messaging. We customized psychiatric consultation for the perinatal population, with additional support provided to obstetric providers regarding psychotropic medications during pregnancy. Videoconferencing between the psychiatric consultant and the patient was available if there was a need for additional diagnostic confirmation and/or further informed consent discussions. Suicidal ideation (SI) was reported as a study adverse event. All SI was handled according to study protocol guidelines.

Measures

Surveys (providers and patients) and end of study focus groups (patients and CMs)—We assessed the feasibility and acceptability of the intervention by using surveys and focus groups. Obstetric providers in the clinic completed surveys before the study began, and at study end. Patients who completed the study were given a 22 question survey regarding their experiences with the intervention, and suggestions for improvement. The last question in the patient survey asked if they would be interested in participating in a focus group. Nine patients expressed interest, and we conducted two patient focus groups with six and three participants each. An experienced investigator independent of the study team conducted the 90 minute focus group, using an interview guide. The interview guide

contained open-ended questions informed by a literature review, to elicit participants' opinions regarding perinatal depression treatment in an obstetric clinic, such as "What was your experience of participation in depression care in an obstetric clinic?" Participants received a \$50 gift card at completion. The same investigator also conducted an end of study 90 minute focus group among the three CMs, to obtain their perspective on ease of delivery of mental health care in an obstetric setting. We audio recorded, transcribed and checked the focus groups for accuracy.

Depression outcome measures—Our secondary outcomes were change in PHQ-9 score from baseline to study end, rates of depression remission (end of study PHQ-9 <5), response (end of study PHQ-9 <10) and proportion of patients who had a >50% reduction in their PHQ-9 scores. The PHQ-9 was measured at baseline, study end, and at every CM visit. We also measured the Edinburgh Postnatal Depression (EPDS) score [28] at baseline and final visits.

Data analysis—We summarized patient demographics and survey results using descriptive statistics. We report baseline characteristics on 27 enrolled women, and process and outcome measures on the 25 women who had at least two PHQ-9 scores recorded. We measured effect sizes using Hedge's *g* for change between baseline and end depression scores. As we did not have a control arm, we planned to compare our effect sizes with those of the intervention arm in the original DAWN randomized controlled trial [16]. We used qualitative analysis software (<http://atlasti.com/>) to assist with the analysis of patient and CM focus groups. Using a modified grounded theory approach [29], we discussed emergent themes and codes related to our research question regarding acceptability and resolved coding discrepancies by discussion between AB and a second researcher. We began with open coding and used constant comparisons[29] to link codes and themes across patient focus groups and with related content in the CM focus group.

Results

Recruitment and retention

During the period of active recruitment, 118 of 168 (70.2%) women with second trimester/postpartum visits received the depression screen. Of those screened, 32 (27.1 %) had a PHQ-9 score of 10 or more. Of those who screened positive, one was ineligible due to being less than 18 years old. Of eligible women, four (12.9%) declined treatment or did not follow through after initial contact. In all, 27 women (87.1%) enrolled. Of these 27 women, 25 (92.6%) completed more than one study visit (Figure 1).

Demographic and baseline clinical characteristics (Table 1)

Our study population was young and ethnically diverse, with a mean age of 29 (± 6.5). Fourteen of the 27 women (51.9%) were pregnant. The mean baseline PHQ-9 score was 15.3 (± 4.0), indicative of moderate depression. Fifty two percent of all, and 42.9% of pregnant women, chose antidepressant treatment with or without PST, while others chose only PST. Patients received an average of 5.8 (SD 3.4, range 1 to 16) clinic visits, 1.9 (SD 1.7, range 0

to 5) phone calls, 18.6 (SD 12.9, range 2 to 56) text messages and one (SD 2, range 0 to 7) home visit.

Treatment outcomes (Table 2)

PHQ-9 scores declined from a baseline score of 15.3 ± 4.0 to 6.2 ± 4.4 for an effect size of 2.1 (95% CI 1.1 – 3.3, $p < 0.001$), over an average treatment time of 14.4 weeks (SD 4.8, range 5.7 to 23.1). Two patients reported suicidal ideation, one at baseline and one at week 4. At study end, 80% (n=20) of patients had PHQ – 9 scores of less than 10, 64% (n=16) had 50% or more decrease in their PHQ – 9 score, and 32% (n = 8) attained PHQ – 9 scores of less than 5.

Acceptability (Survey and focus group results)

Obstetric provider surveys—In a pre-intervention survey of 10 obstetric providers in the clinic, a majority 70% (n= 7) felt they had the appropriate training to identify depression, but only 30% (n=3) felt they had the appropriate training to treat depression. Most providers 70% (n=7) were dissatisfied with the resources available to treat depression in their practice before the Collaborative Care intervention. In a post-intervention survey of 6 obstetric providers in the clinic, 83% (n=5) felt that that Collaborative Care had improved clinical outcomes and was most helpful in: 1) treatment and proactive follow-up, and 2) monitoring of progress.

Patient surveys and focus groups—Seventeen of 25 patients (68%) responded to the study completion survey. All women surveyed reported they would recommend the intervention to family/friends. In rating the helpfulness of different CM visit types, 83% (n=14) found clinic visits to be ‘helpful’ or ‘very helpful’, as compared to 88% (n=15) for text messaging, 60% (n=10) for phone calls and 29% (n=5) for home visits. Focus group content revealed a common theme, women felt receiving depression care in an obstetric clinic was appropriate. Patients expressed a preference for their depression treatment to be considered a part of regular prenatal care:

“Well, I would say that it’s depression care, but it’s trying to incorporate different aspects of your healthcare into one program. Instead of differentiating your pregnancy from your depression,one stop shop kind of approach” and “it was convenient, and a lot of people don’t think to even talk to them about this (referring to depression), and it’s part of your – it’s part of your prenatal care”.

Care manager focus groups—Analysis of CM focus groups revealed that CMs identified several strengths to the Collaborative Care approach: team work (better for patients: “so many more people advocating” and better for CMs “never felt like we were on our own”), access to psychiatric consultation, and training in evidence-based behavioral interventions. CMs identified challenges, including administrative limitations, little time for paperwork, not being integrated into the clinic and lack of regular discussions with individual obstetric providers.

Discussion

Screening for perinatal depression is slated to become part of routine prenatal care, with several agencies recommending universal screening during pregnancy and postpartum. While it is relatively easy to screen for depression in an obstetric setting using standardized screening instruments [30], obstetricians may be reticent to implement universal screening due to concerns regarding mental health care access for women who screen positive. Depression treatment programs integrated into obstetric settings not only address these concerns, but are also responsive to patient preference for obtaining depression care in primary care and obstetric settings [31].

We report on the implementation of a screening and intervention program for depression - Depression Attention for Women Now or DAWN Collaborative Care - in a rural obstetric clinic. Only 70.2% of eligible women in the clinic were screened for depression. This low rate is worth improving upon in a setting that calls for universal screening. Integration of the screening instrument into the electronic medical record may result in higher screening rates [32]. However, previous “real world” studies looking at implementation of universal screening for depression in primary care settings reported screening completion rates of about 70% even with clinic support optimization (e.g. a research assistant to ensure screening implementation) [33].

The 27.1% prevalence of positive depression screens was relatively high, but not surprising for a clinic that serves high risk women, including racial and ethnic minorities and low income women [34]. It is doubtful that our screening instrument contributed to these high rates as the PHQ-9 is validated for use in perinatal populations [35]. One possible explanation for the high rates of positive depression screens, especially given that not all women were screened, is selective screening, i.e., providers were more likely to screen women who appeared to have depression.

Overall, we found that it is feasible to integrate perinatal depression treatment into an obstetric clinic. Only 4 of the 31 women who were eligible declined participation, a recruitment rate of 87.1%. Rates of retention in treatment were similarly high at 92.6% and comparable to those of randomized controlled trials in similar populations [16, 17]. These recruitment and retention rates are encouraging considering that we did not offer any material incentives for completion of CM visits. Most of the clinic visits were scheduled immediately before or after the patient met their obstetric provider. CMs scheduled home visits according to the patients’ preference and contacted patients regularly via text messages. Each may have contributed to the high retention rates.

Our calculated effect size for change over time of 2.1 (95% CI 1.1 – 3.3, $p < 0.001$) for PHQ-9 and 1.01 (95% CI 0.38 – 3.1) for EPDS is comparable to the effect size of 1.1 (95% CI 1.016 – 1.204) at 6 months in the intervention arm of the original DAWN study [16]. Although this comparison is between populations from different studies, the sampling frames and outcome measures are similar. Effect sizes calculated from pilot studies can be imprecise [36], but can provide an estimate of the direction of treatment effect. The two patients who reported suicidal ideation, on detailed evaluation, were deemed appropriate to

continue in the intervention and went on to have a reduction in suicidal ideation and depressive symptoms.

All providers perceived DAWN Collaborative Care for perinatal depression to be feasible, acceptable and not disruptive. CMs were not direct employees of the clinic and identified this as a challenge, but also used this to their advantage in the delivery of patient care. For example, two of the CMs were part of the county maternal child health home visiting program and utilized their knowledge of county resources to connect their patients with additional services and to provide continuity at completion of the study.

Limitations of this study include small sample size, and lack of a randomly assigned control group. It is possible that improvement in symptoms was due to spontaneous improvement in depression, regression to the mean or nonspecific treatment effects. In our survey and focus group analyses, we could not control for possible confounding variables, such as self-selection or social desirability. Our results are based on data obtained from a rural obstetric clinic of English-speaking women in a community of migrant farmworkers and may not be generalizable to other populations. Mean follow-up was 14.4 weeks, and we do not know if the improvement in depression was sustained beyond that period. We also do not have demographic or baseline depression data on the women who declined to participate.

While we cannot use the effect size from this study to perform power calculations for a larger study, we will use data from this pilot study to refine recruitment, consent, and intervention procedures based on patient and provider input.

Practical considerations for providers planning to offer perinatal depression treatment programs in rural clinics include: advantages in hiring healthcare providers and workers from the local community as CMs, need for continuity with community based Maternal Child Health Programs, and the importance of psychiatric consultation.

The importance of screening for depression in the perinatal period is established [9, 10] and 4 states in the United States have enacted mental health policies that include screening for perinatal depression [37]. As more states follow suit and add mandated screening for perinatal depression to existing policies on patient education and public awareness, it is important to have mechanisms in place to offer mental health treatment for women in need. The Center for Medicare and Medicaid Services (CMS) recently announced new payment codes for Collaborative Care consistent with the model we tested in this pilot study. CMS is also finalizing payment for a new code that describes behavioral health integration for practices which are not yet ready to implement Collaborative Care [38]. In this context, our finding that it is feasible and acceptable to deliver Collaborative Care for perinatal depression in a rural obstetric clinic is well timed.

Acknowledgments:

The authors would like to thank Nancy Grote, PhD and Anna La Rocco Cockburn, LICSW, MPH, for training the care managers; Erin McCoy, MPH for conducting the focus groups, Theresa Hoeft for helping with qualitative analysis, and Terel Cuevas, RN, Celisa Hopkins, BA, and Jennifer Sumner, RN, the wonderful care managers. We also extend our gratitude to the original DAWN team – Wayne Katon, MD (posthumously), Jennifer Melville, MD, MPH, Carmen Croicu, MD and Evette Ludman, PhD. We thank Anne Turner, MD for feedback provided in her role as thesis advisor to Dr. Bhat.

Funding details:

DAWN was funded by R01 MH085668, PI Unützer.

At the time of this study, Amritha Bhat was a postdoctoral fellow in the NIMH 537 T32 MH20021 Psychiatry-Primary Care Fellowship Program Training Grant. Amritha Bhat also acknowledges funding for this work from the U.S. Department of Health and Human Services, Health Resources and Services Administration's Maternal and Child Health Bureau (Title V, Social Security Act), grant # T76MC00011-21-00.

Biographical notes.

Amritha Bhat, MBBS, MD is a psychiatrist trained in both India and the United States. She established the perinatal psychiatry clinic at the University of Washington Medical Center is actively involved in projects that make mental health care accessible to women during pregnancy and postpartum.

Susan Reed, MD, MPH has practiced for over 25 years in the Seattle area and is professor and chief of service for obstetrics and gynecology at Harborview Medical Center with an adjunct appointment in epidemiology. She is program director for the UW Women's Reproductive Health Research Center.

Johnny Mao, MPH has an MPH in community-oriented public health practice. He has implemented and evaluated large-scale and individualized activities for Collaborative Care programs throughout the United States.

Mindy Vredevoogd, MS is Assistant Director for Research and Evaluation and manages research and program evaluation projects for the AIMS (Advancing Integrated Mental Health Solutions) Center and the Division of Population Health at the University of Washington. She has more than 10 years of experience as a research scientist and project coordinator within public health projects and programs.

Joan Russo, PhD is an Associate Professor of Psychiatry. She received her Ph.D. in psychology, with a specialization in psychiatric epidemiology and statistics. She serves as a statistician, methodologist and psychometrician for the department, specializing in health services and outcomes research.

Jennifer Unger, MD, MPH is an Assistant Professor, Obstetrician-Gynecologist and clinical researcher focusing on the utilization of novel technologies and behavioral interventions to improve global maternal child health and family planning.

Roger Rowles, MD has practiced in Yakima, WA since 1979. He is a fellow of the American College of Obstetrics and Gynecology, Medical Director of the Obstetric Unit and chairs the Perinatal Quality Assurance Committee at Yakima Valley Memorial Hospital.

Jürgen Unützer, MD, MPH, MA is Professor and Chair in the Department of Psychiatry and Behavioral Sciences at the University of Washington with adjunct appointments as Professor in the School of Public Health and as Affiliate Investigator at the Group Health Research Institute in Seattle, WA. He is an internationally recognized psychiatrist and health services researcher. His work focuses on innovative models of care that integrate mental health and

general medical services and on translating research on evidence-based mental health care into effective clinical and public health practice.

References:

1. Gavin NI, Gaynes BN, Lohr KN, et al. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol.* 2005 11;106(5.1):1071–83. doi: 10.1097/01.AOG.0000183597.31630.db. PubMed PMID: ; eng. [PubMed: 16260528]
2. Kendig S, Keats JP, Hoffman MC, et al. Consensus bundle on maternal mental health: perinatal depression and anxiety. *Journal of Obstetric, Gynecologic & Neonatal Nursing.* 2017;46(2):272–281.
3. Kim JJ, La Porte LM, Saleh MP, et al. Suicide Risk Among Perinatal Women Who Report Thoughts of Self-Harm on Depression Screens. *Obstetrics & Gynecology.* 2015;125(4):885–893. [PubMed: 25751206]
4. Letourneau NL, Tramonte L, Willms JD. Maternal depression, family functioning and children's longitudinal development. *Journal of pediatric nursing.* 2013;28(3):223–234. [PubMed: 22940454]
5. Curtis MA, Corman H, Noonan K, et al. Maternal depression as a risk factor for family homelessness. *Journal Information.* 2014;104(9).
6. Noonan K, Corman H, Reichman NE. Effects of maternal depression on family food insecurity. *Economics & Human Biology.* 2016;22:201–215. [PubMed: 27281498]
7. Goodman SH, Gotlib IH. Risk for psychopathology in the children of depressed mothers: a developmental model for understanding mechanisms of transmission. *Psychological review.* 1999;106(3):458. [PubMed: 10467895]
8. O'Donnell KJ, Glover V, Barker ED, et al. The persisting effect of maternal mood in pregnancy on childhood psychopathology. *Development and psychopathology.* 2014;26(02):393–403. [PubMed: 24621564]
9. American College of Obstetricians and Gynecologists. Screening for Perinatal Depression. *Obstet Gynecol.* 2015 (Committee Opinion No. 630.).
10. Siu AL, U. S. Preventive Services Task Force, . Screening for depression in adults: US preventive services task force recommendation statement. *JAMA.* 2016;315(4):380–387. doi: 10.1001/jama.2015.18392. [PubMed: 26813211]
11. Byatt N, Levin LL, Ziedonis D, et al. Enhancing Participation in Depression Care in Outpatient Perinatal Care Settings: A Systematic Review. *Obstet Gynecol.* 2015 11;126(5):1048–58. doi: 10.1097/aog.0000000000001067. PubMed PMID: ; PubMed Central PMCID: . eng. [PubMed: 26444130]
12. Roll JM, Kennedy J, Tran M, et al. Disparities in unmet need for mental health services in the United States, 1997–2010. *Psychiatric Services.* 2013.
13. Geier ML, Hills N, Gonzales M, et al. Detection and treatment rates for perinatal depression in a state Medicaid population. *CNS Spectr.* 2015 2;20(1):11–9. doi: 10.1017/s1092852914000510. PubMed PMID: ; eng. [PubMed: 25307282]
14. Unützer J, Harbin H, Schoenbaum M, et al. The collaborative care model: An approach for integrating physical and mental health care in Medicaid health homes. *Health Home, Information Resource Center* 2013:1–13.
15. Huang HM Tabb KM Cerimele J, et al. Collaborative Care for Women With Depression: A Systematic Review. *Psychosomatics.* 2017;58(1):11–18. [PubMed: 27842779]
16. Melville JL, Reed SD, Russo J, et al. Improving care for depression in obstetrics and gynecology: a randomized controlled trial. *Obstet Gynecol.* 2014 6;123(6):1237–46. doi: 10.1097/aog.0000000000000231. PubMed PMID: ; PubMed Central PMCID: . eng. [PubMed: 24807320]
17. Grote NK, Katon WJ, Russo JE, et al. Collaborative care for perinatal depression in socioeconomically disadvantaged women: a randomized controlled trial. *Depression and anxiety.* 2015.

18. Goodman JH. Women's Attitudes, Preferences, and Perceived Barriers to Treatment for Perinatal Depression. *Birth*. 2009;36(1):60–69. doi: 10.1111/j.1523-536X.2008.00296. [PubMed: 19278385]
19. Hauenstein EJ, Petterson S, Rovnyak V, et al. Rurality and mental health treatment. *Administration and Policy in Mental Health and Mental Health Services Research*. 2007;34(3):255–267. [PubMed: 17165139]
20. Rost K, Smith GR, Taylor JL. Rural-urban differences in stigma and the use of care for depressive disorders. *J Rural Health*. 1993 Winter;9(1):57–62. PubMed PMID: ; eng. [PubMed: 10124199]
21. Mynors-Wallis LM, Gath DH, Day A, et al. Randomised controlled trial of problem solving treatment, antidepressant medication, and combined treatment for major depression in primary care. *BMJ*. 2000;320. doi: 10.1136/bmj.320.7226.26.
22. Grote NK, Swartz HA, Geibel SL, et al. A randomized controlled trial of culturally relevant, brief interpersonal psychotherapy for perinatal depression. *Psychiatric Services*. 2009;60(3):313–321. [PubMed: 19252043]
23. LaRocco-Cockburn A, Reed SD, Melville J, et al. Improving depression treatment for women: integrating a collaborative care depression intervention into OB-GYN care. *Contemp Clin Trials*. 2013 11;36(2):362–70. doi: 10.1016/j.cct.2013.08.001. PubMed PMID: ; PubMed Central PMCID: . eng. [PubMed: 23939510]
24. Lancaster GA, Dodd S, Williamson PR. Design and analysis of pilot studies: recommendations for good practice. *J Eval Clin Pract*. 2004 5;10(2):307–12. doi: 10.1111/j.2002.384.doc. PubMed PMID: ; eng. [PubMed: 15189396]
25. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric annals*. 2002;32(9):509–515.
26. Spitzer RL, Williams JB, Kroenke K, et al. Validity and utility of the PRIME-MD patient health questionnaire in assessment of 3000 obstetric-gynecologic patients: the PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *American journal of obstetrics and gynecology*. 2000;183(3):759–769. [PubMed: 10992206]
27. Grote NK, Zuckoff A, Swartz H, et al. Engaging women who are depressed and economically disadvantaged in mental health treatment. *Soc Work*. 2007 10;52(4):295–308. PubMed PMID: ; PubMed Central PMCID: . eng. [PubMed: 18232240]
28. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *The British journal of psychiatry*. 1987;150(6):782–786. [PubMed: 3651732]
29. Corbin J, Strauss A. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage publications; 2014.
30. Marcus SM, Flynn HA, Blow FC, et al. Depressive symptoms among pregnant women screened in obstetrics settings. *Journal of Women's Health*. 2003;12(4):373–380.
31. Byatt N, Biebel K, Friedman L, et al. Patient's views on depression care in obstetric settings: how do they compare to the views of perinatal health care professionals? *General hospital psychiatry*. 2013 Nov-Dec 08/19;35(6):598–604. doi: 10.1016/j.genhosppsych.2013.07.011. PubMed PMID: . [PubMed: 23969144]
32. Rowan P, Greisinger A, Brehm B, et al. Outcomes from implementing systematic antepartum depression screening in obstetrics [Article]. *Archives of Women's Mental Health*. 2012;15(2):115–120. doi: 10.1007/s00737-012-0262-6. PubMed PMID: .
33. Valenstein M, Dalack G, Blow F, et al. Screening for Psychiatric Illness with a Combined Screening and Diagnostic Instrument. *Journal of General Internal Medicine*. 1997;12(11):679–685. doi: 10.1046/j.1525-1497.1997.07141. PubMed PMID: . [PubMed: 9383136]
34. Zhang S, Cardarelli K, Shim R, et al. Racial disparities in economic and clinical outcomes of pregnancy among Medicaid recipients. *Maternal and child health journal*. 2013;17(8):1518–1525. [PubMed: 23065298]
35. Sidebottom AC, Harrison PA, Godecker A, et al. Validation of the Patient Health Questionnaire (PHQ)-9 for prenatal depression screening. *Archives of women's mental health*. 2012;15(5):367–374.

36. Leon AC, Davis LL, Kraemer HC. The role and interpretation of pilot studies in clinical research. *Journal of psychiatric research*. 2011;45(5):626–629. [PubMed: 21035130]
37. Rowan PJ, Duckett SA, Wang JE. State mandates regarding postpartum depression. *Psychiatr Serv*. 2015 3 01;66(3):324–8. doi: 10.1176/appi.ps.201300505. PubMed PMID: ; eng. [PubMed: 25727124]
38. Centers for Medicare and Medicaid Services. Medicare finalizes substantial improvements that focus on primary care, mental health, and diabetes prevention. 2016.

Current knowledge on this subject

Perinatal depression is common and has implications for mothers and children. While screening for perinatal depression is becoming common practice, follow up rates for mental health treatment remain low. Collaborative Care integrates mental health treatment in medical settings and is feasible and effective in *urban* primary care and obstetric settings.

What this study adds:

It is feasible to implement collaborative Care for perinatal depression in a *rural* obstetric setting. Recruitment and retention rates and depression outcomes are similar to those in other settings.

Figure 1.
Consort flow diagram.

Table 1:

Baseline characteristics among 27 participants

Characteristics	
Age, Mean (SD)	29 (6.5)
Race / Ethnicity, N (%)	
American Indian/Alaska Native	5 (18.5%)
Black or African American	1 (3.7%)
White	14 (51.9%)
Hispanic or Latino	7 (25.9%)
Pregnancy status, N (%)	
Pregnant	14 (51.9%)
Postpartum	10 (37.0%)
Planning conception	2 (7.4%)
Post abortion	1(3.7%)

Table 2:

Treatment outcomes among 27 participants

Baseline depression score, Mean (SD)	
PHQ-9 score	15.3 (4.0)
EPDS score	16.3 (5.8)
Final depression score, Mean (SD)	
PHQ-9 score	6.3 ± 4.4
EPDS score	9.7 ± 5.3
Other depression outcome measures, N (%)	
Response (Final PHQ-9 <10)	20 (80%)
50% improvement PHQ-9	16 (64%)
Remission (Final PHQ-9 <5)	8 (32%)