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The Impact of a Brief Obstetrics Clinic-Based Intervention on Treatment Use for Perinatal Depression

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ABSTRACT

Objective: **The purpose of this study was to examine the association of prenatal depression screening and obstetrics clinician notification procedures with depression treatment use through 6 weeks postpartum.**

Methods: **An initial sample of 1298 women was screened for depression as part of routine clinical care at their first prenatal care appointment using the Edinburgh Postnatal Depression Scale (EPDS) at a university hospital obstetrics clinic in the United States. Women with an EPDS > 10 who agreed to participate in this longitudinal study completed assessments of depression and treatment use throughout pregnancy and through 6 weeks postpartum. Following screening and prior to their second prenatal visit, all women scoring ≥ 10 on the EPDS received nurse-delivered depression feedback and referral, and all treating physicians were notified of the elevated EPDS status (i.e., ≥ 10) of their patients.**

Results: **The majority (65%) of pregnant women with current major depressive disorder (MDD) were not receiving any depression treatment throughout the study period. Overall, women with EDPS ≥ 10 who reported that their physician discussed depression with them (67%) were significantly more likely to seek treatment (compared with those who did not report physician discussion of depression with them) by the 1 month prenatal follow-up but not by the 6 weeks postpartum follow-up. Initial depression severity and treatment use prior to screening were the strongest predictors of subsequent depression treatment use.**

Conclusions: **Depression screening combined with systematic clinician follow-up showed a modest short-term impact on depression treatment use for perinatal depression but did not affect depression outcomes. Most women with MDD were not engaged in treatment throughout the follow-up period despite the interventions. More intensive and repeated monitoring might enhance the effect of clinician interventions to improve treatment use.**

INTRODUCTION

Perinatal depression is among the most common complications of pregnancy and a major public health concern. The prevalence of depression during pregnancy has been found to be close to 25% based on self-report measures and 12% based on diagnostic measures.[1] Untreated perinatal depression has been found to impact the physical, cognitive, and interpersonal function-

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ing of women and their children.[2–5] Despite its prevalence, several recent studies have demonstrated vastly inadequate detection and treatment of perinatal depression in obstetrics care settings.[6–9] The prevalence of perinatal depression, its psychosocial and medical consequences, and the worsening course of depression without treatment highlight the public health importance of early detection and improved treatment strategies. The overall aim of this study was to examine depression treatment rates throughout the prenatal period and the immediate postpartum period associated with a prenatal depression screening program.

Albeit a different population and setting, research in primary care settings has found that depression screening alone has a limited impact on depression outcomes without quality improvement enhancements, such as standardized follow-up assessment and treatment protocols.[10,11] Much less is known about the impact of screening on depression outcomes in obstetrics settings, and few studies have directly examined the question of whether prenatal screening leads to improved depression treatment use.[12] Although most obstetrician/gynecologists in a recent survey reported that they conduct some form of depression screening, skepticism about the beneficial impact of screening on depression outcomes was commonly noted in that survey.[13] There is accumulating evidence, however, that provision of some form of psychosocial intervention to women at risk for depression leads to decreased perinatal symptomatology.[12] Thus, a reasonable first step in the process of understanding how to improve depression outcomes is research on the utility of screening and brief clinic-based interventions, designed to improve treatment follow-through, that may be feasibly implemented within busy clinic settings. Although undertreatment of perinatal depression has been described previously, this paper further clarifies the extent of the problem by providing information on both patient symptom level and DSM-IV depression diagnosis and includes longitudinal assessments of depression and treatment from the first prenatal care visit through 6 weeks postpartum.

Specifically, this study examined the effect of routine depression screening using a validated screening tool, physician notification of screening results, and nurse-delivered feedback and referral on treatment use throughout pregnancy and the early postpartum period. Primary analyses for this study focused on the sample of prenatal care-seeking women who scored ≥ 10 on the Edinburgh Postnatal Depression Scale (EPDS). Rates of seeking depression treatment following the intervention were examined for women with EPDS ≥ 10, both with and without a diagnosis of major depressive disorder (MDD), based on a structured interview. We hypothesized that baseline rates of depression treatment would be low but would increase significantly throughout the study period after systematic depression detection, feedback, and referral. Specifically, we expected that greater depression severity,[14] recent (i.e., prior to seeking prenatal care) depression treatment, and physician discussion of depression would be associated with increased likelihood of depression treatment during the follow-up period.

MATERIALS AND METHODS

Procedures

Between November 2002 and January 2004, all new obstetrics patients were screened for depression ($n = 1298$) using the EPDS as part of newly implemented routine screening at a university-affiliated obstetrics clinic in Michigan. Four obstetrician/gynecologists and two nurse practitioners provided prenatal care for patients at the clinic site. The majority of the visits to the clinic are paid by private insurance/HMO (87%), 10% are paid by Medicaid, and 3% are self-pay/other. The EPDS was given to patients along with other clinical intake materials at the beginning of the first prenatal care visit by clerical staff. After self-completing the EPDS, women were asked to indicate at the end of the screening form whether or not they would be interested in being contacted about a research study. All study procedures were approved by the University of Michigan Institutional Review Board. All women with EPDS scores ≥ 10 were referred for treatment regardless of study participation.

All English-speaking pregnant women aged $\geq$18, who agreed to participate and who scored ≥ 10 on the EPDS were contacted to complete study interviews at baseline (within 2 weeks of the screening visit, $n = 73$), 1 month after baseline (prenatal interview), and 6 weeks postpartum. The prenatal baseline interview was administered to women by clinical research staff at an average of 14 days after their second prenatal

care visit (SD = 13.5 days). Thus, this interview occurred after the physician had the opportunity to discuss the screen or other depression-related information and after the nursing staff had contacted women who scored ≥ 10 on the EPDS via telephone.

The intervention for the study consisted of screening follow-up procedures including (1) notifying the treating physician of their patient's elevated (≥ 10) EPDS status and (2) nurse-delivered depression feedback and referral. To accomplish these tasks, the summed depression scores from the EPDS were entered into the electronic medical record into fields that would be viewed by the physician prior to the second prenatal care visit with the patient. Women who scored ≥ 10 on the EPDS were flagged in the medical record as high risk for depression. All participants with EPDS scores ≥ 10 were also contacted by telephone by nurses between the screening (i.e., initial prenatal care) visit and their second prenatal care visit. The purpose of this call was provision of feedback and information about depression screening scores, education about depression, and provision of referral information. The precise content of the conversation was not scripted but was allowed to vary in order to approximate usual care by the nurses. This information was embedded within clinical and educational interactions with patients delivered by nurses as part of their standard clinical responsibilities. The nurses provided referrals that were most appropriate for each individual patient based on patient preference, insurance status, and ease of geographic access. For example, if a woman preferred counseling, she was referred to a provider in her preferred geographic area who accepted her insurance plan. The primary referral source provided was to the on-site mental health social worker. The role of the social worker is to conduct a thorough clinical assessment with all referred patients and provide treatment as usual based on this assessment (e.g., psychotherapy, referral to psychiatry). The initial social work appointment was offered for no fee for women without insurance coverage for the visit. All the women who scored ≥ 10 on the EPDS had the opportunity to talk with the nursing staff about their depression screen, regardless of study participation.

Measures

The EPDS[15] was used as the depression screening tool. The EPDS is a 10-item screen designed for use with perinatal women and for ease of administration and scoring by a wide range of healthcare workers and has been found to be an effective screening tool for identifying women with depressive symptoms during pregnancy.[1] A cutoff score of 10 has been the most commonly studied[12] cutoff point for detection of depression in the postpartum period, found to have sensitivity at this score ranging from 0.65 to 1.0 and specificity ranging from 0.76 to 1.0 to detect MDD.[16]

The baseline interview was administered by a Masters or Ph.D. level mental health clinician trained in clinical psychiatric diagnosis. This interview was administered either face-to-face in a location convenient for the participating woman (41%, $n = 29$) or over the telephone (59%, $n = 44$). In order to accommodate women's preferences, they where asked to choose which method of administration would be most convenient for them. The Mood Disorders Module of the Structured Clinical Interview for DSM-IV (SCID)[17] was used to obtain a diagnosis of current and past depression, including history of psychiatric treatment. The SCID is a structured, validated clinical diagnostic interview designed and tested to yield a valid and reliable diagnosis of MDD. SCID training included formal training sessions with experienced SCID interviewers, completion of SCID training videotape series, and quality assurance monitoring (including feedback) of initial interviews by experienced SCID interviewers. Depression severity was assessed using the Beck Depression Inventory-II (BDI-II).[18] In a medical sample, internal reliability of the BDI-II has been found to be $\alpha = 0.94$,[19] and it has been found to have a strong correlation ($r = 0.62$) with clinician diagnosis of minor/major depression based on DSM-IV[20] in postpartum samples.

Depression treatment use was assessed by items asking participants to indicate whether they had received counseling, psychotherapy, or medications for depression since their prior interview. In addition to depression treatment information during the study period, the baseline interview also assessed any treatment within the 3 months prior (time 1 treatment use) to their initial prenatal care visit. All depression treatment information was corroborated by medical chart review. The 1-month prenatal and 6-week postpartum follow-up interviews were administered over the telephone and included repeated measures of depressive severity (BDI-II) and depres-

sion treatment use. At 6 weeks postpartum (but not at the 1-month prenatal interview), current depression diagnosis was reassessed using the SCID. Therefore, assessments of treatment use included four time points: time 1, 3-month time frame prior to the first prenatal care visit (based on medical chart review and baseline interview); (time 2, time frame between the first prenatal care visit and the baseline prenatal interview (based on the baseline interview after the second prenatal care visit and notification of the physicians of screening results); time 3, time frame between the baseline prenatal interview and 1-month follow-up interview (based on prenatal follow-up interview 1 month after baseline); time 4, time frame between the 1-month prenatal interview and 6 weeks postpartum (based on postpartum follow-up interview).

Data plan

Differences in demographics based on depression (prenatal MDD) status were evaluated using the Pearson chi-square test for association or *t* tests for mean differences. A p value < 0.05 was considered statistically significant in all tests. Percentages of women seeking treatment at each assessment period based on MDD status are presented, as are percentages of women seeking treatment based on whether their physician discussed depression with them. In addition to bivariate differences in treatment seeking based on physician discussion, we were interested in the relationship of physician discussion to treatment use when other variables expected to impact treatment were considered. Therefore, among study participants ($n = 73$), we conducted multivariate analyses of predictors of treatment use over the study period. The treatment use variable was a dichotomous variable defined as any counseling/psychotherapy or medications for depression during the assessment period. Whether or not women sought treatment over time (prenatal baseline, 1 month after baseline, and 6 weeks postpartum) was examined fitting a multivariate logistic regression model to the repeated measures treatment use data using generalized estimating equation (GEE) methodology to account for the likely correlations of the repeated measures.[21] Because depression severity has been found to be a strong predictor of seeking treatment, this variable was examined in the multivariate model along with depression treatment use just prior to the first prenatal care visit (assuming that those already in treatment would be more likely to continue treatment). Therefore, potential predictors of the repeated measures binary treatment use variable (1 = Yes, 0 = No) included baseline depression severity as measured by BDI-II, any treatment use in the 3 months prior to the initial screening visit (yes/no), and whether or not the treating physician had discussed depression with each participant (yes/no). Estimates based on the logistic regression model were used to examine patterns in dichotomous depression treatment use over time and explore the relationships of depression severity, treatment before the initial visit, and physician depression discussion with the likelihood of seeking depression treatment over time. Odds ratios (ORs) representing the relationships of the predictors with the odds of seeking treatment were derived, and 95% confidence intervals (95% CI) for the ORs were calculated based on the adjusted standard errors found using the GEE methodology (to account for the correlations of the repeated measures). All analyses were conducted using SPSS version 11 (Chicago, IL) and SAS version 9.1 (Cary, NC).

RESULTS

Participation data

A total of 1298 women seeking prenatal care overall were screened for depression using the EPDS, with a 95% completion rate. Overall, 16% ($n = 207$) of women screened scored above the cutoff of $\geq$10 on the EPDS. Among those women scoring ≥ 10 on the EPDS, 53% ($n = 110$) agreed to be contacted for the research study. Reasons for refusal to be contacted were not collected because of privacy constraints associated with the recruitment method. There were no significant differences in depression (EPDS) scores between women who agreed to participate and those who did not. There were significant differences in self-identified racial/ethnic group (chi-square (8) = 61.7, $p < 0.001$) between women who agreed to participate and those who did not, with significantly more Caucasian women (56.4%) agreeing to participate in the research as compared with African American women (34%) and Asian American women (36.5%). No differences in marital status, weeks of gestation, parity, household income, or

maternal age were found between those who agreed to participate and those who did not. Women who miscarried (8%, $n = 9$), who were not able to be contacted prior to their next prenatal care visit (12%, $n = 13$), who delivered prematurely (thus, could not complete the baseline interview, 6%, $n = 7$), and who refused because of time constraints (7%, $n = 8$) did not complete the baseline interview, resulting in a total of 73 completed baseline interviews. All women not completing interviews for any reason were offered treatment referral information. There were no significant differences in depression or any of the demographic indicators between women who completed the baseline interview and those who did not. A total of 85% ($n = 62$) completed the 1-month prenatal follow-up interview, and 81% ($n = 60$) completed the postpartum interview. Therefore, a total of 60 women completed all interviews. There were no significant differences in depression or demographics between women completing the follow-up interview and those who did not.

Demographic information on the sample based on prenatal MDD status is shown in Table 1. Women were screened at their initial prenatal care visit at an average of 15 weeks gestation (SD = 7.5) overall, ranging from 8.5 to 35 weeks. No differences in BDI-II scores, MDD, or treatment use were found based on number of weeks pregnant at screening. Most women reported that they completed high school or greater educational attainment (98%, $n = 71$), with 28% ($n = 20$) of those women completing some college, and 30% ($n = 21$) reported graduating from college. As can be seen in Table 1, women meeting MDD criteria at the baseline prenatal interview were found to be significantly younger and completed fewer years of education than women who did not meet MDD criteria. No other demographic differences were found based on MDD status.

Table 1. Sample Demographic Characteristics and Differences Based on Prenatal Major Depressive Disorder (MDD) Status, $n = 73$

Variable	*MDD*	*No MDD*
Maternal age[a]	28.7 (5.4)*	31.4 (4.5)
Weeks pregnant at screening[a]	16.5 (8.0)	14.0 (7.0)
Number of other children[a]	0.96 (0.94)	0.73 (0.85)
Years of completed education[a,b]	4.6 (0.94)*	5.2 (1.0)
Annual gross household income[a,c]	2.2 (3.4)	2.9 (4.0)
Marital status		
Married or live-in partner[d]	34 (25)	56 (41)
Race[d]		
Caucasian	27 (20)	48 (35)
African American	7 (5)	1.3 (1)
Asian American	4 (3)	7 (5)
Latina	0 (0)	3 (2)
Other racial group	1.4 (1)	1.4 (1)
Insurance status[d]		
Private	30 (22)	55 (40)
Medicaid	7 (5)	3 (2)
Uninsured	1 (1)	1 (1)

[a]Mean (SD).
*$p < 0.05$.
[b]Years of completed schooling scaled as 4 = 13–16 years; 5 = college graduate.
[c]Annual gross household income scaled as 2 = $20,000–$39,999; 3 = $40,000–59,999.
[d]% (n).

Baseline prenatal depression and treatment rates

The mean EPDS score (among all women scoring ≥ 10) was 13.1 (SD = 3.3). Based on the prenatal baseline interview, 40% ($n = 29$ of 73) of women met diagnostic criteria for a current MDD, and an additional 34% ($n = 25$) of women without a current MDD met criteria for lifetime MDD. Thus, 74% ($n = 54$) of women scoring > 10 on the EPDS met diagnostic criteria for current or lifetime MDD. Table 2 shows rates of depression treatment use (including counseling, psychotherapy, or medications) among all study patients with an EPDS ≥ 10 ($n = 73$) over the study assessment period, separated based on whether criteria for current MDD (based on prenatal assessment) were met. Most women meeting criteria for current MDD (90%) were not being treated at the time of their initial prenatal care visit for the previous 3-month period. A total of 65% of women with current MDD (diagnosed at baseline prenatal interview) reported receiving no treatment at any assessment point through 6 weeks postpartum. Among all women with an EPDS score ≥ 10 ($n = 73$), 25% ($n = 19$) reported any depression treatment at the prenatal baseline interview. Of those, 21% ($n = 4$) reported counseling only, 47% ($n = 9$) reported medications only, and 32% ($n = 6$) reported both counseling and medication. Women with an EPDS score ≥ 10 and a previous history of MDD would also arguably benefit from intervention. Among those patients, 5% ($n = 4$) were receiving any depression treatment at baseline.

Physician discussion of depression

As part of the prenatal baseline interview, women were asked to report whether or not their

Table 2. Percentage of Women with EPDS ≥ 10 Receiving Any Depression-Related Treatment (Counseling/Psychotherapy or Medications) Throughout Study Period, Based on Whether (n = 29) or Not (n = 44) Current MDD[a] Criteria Were Met at Prenatal Baseline Interview

	Time 1: 3 months prior to first prenatal care visit	*Time 2: Baseline interview following second prenatal care visit*	*Time 3: 1 month after baseline interview (prenatal)*	*Time 4: 6 week postpartum interview*
EPDS ≥ 10 but no current MDD	16% (n = 7)	21% (n = 9)	21% (n = 9)	18% (n = 8)
Current MDD	10% (n = 3)	35% (n = 10)	35% (n = 10)	28% (n = 8)

[a]MDD, current major depressive disorder based on structured interview for DSM-IV diagnosis.
[b]Depression screening, physician notification of high-risk status, nurse telephone-delivered feedback, and second prenatal care visit occurred between time 1 and time 2 assessments.

physician had discussed their positive depression screen with them at the second prenatal care visit (i.e., following physician notification of positive depression screening results). Sixty-seven percent (n = 49) of participants reported that depression was discussed during their visit, 58% (n = 42) of whom reported that the conversation was initiated by the physician. Whether or not physicians discussed the positive depression screen with the patient was unrelated to the severity of the patient's depression (based on BDI-II scores) or depressive diagnostic status (current or lifetime MDD).

Changes in depression treatment use

During the 3-month period prior to the screening and intervention, 14% (n = 10) of women scoring ≥ 10 on the EPDS overall were receiving any depression treatment. Following the intervention and throughout the follow-up period, close to 30% of women reported use of any depression treatment. Women who reported discussing depression with their physician were significantly more likely to have sought depression treatment at the 1-month prenatal follow-up period (39%) compared with those who did not discuss depression with their physician (15%) (chi-square (1) = 3.6, p = 0.05). However, no significant differences in treatment use based on physician discussion of depression were found at the 6-week postpartum follow-up. Specifically, 18% of women who did talk with their physician about depression at their second obstetrics appointment reported treatment at 6 weeks postpartum compared with 14% who did not talk with their physician about depression. Similar to prenatal baseline, 67% (n = 6) of women with a new or continuing diagnosis of MDD at 6 weeks postpartum (based on the SCID interview administered at that assessment) were not receiving any depression treatment at 6 weeks postpartum. Among women who met criteria for MDD at baseline (n = 29), 24% (n = 7) also met criteria for current MDD at the 6-week postpartum follow-up. Women who did meet criteria for a current MDD at the 6-week postpartum assessment were not found to be more likely to be in treatment at any point during the study than women who no longer met criteria for depression. Comparisons of depression outcomes at all time points between women who did and did not seek depression treatment revealed no significant differences either in depression severity as measured by BDI-II or in MDD status.

In order to determine the relationship of physician discussion of depression in conjunction with other variables expected to impact treatment seeking, such as depression severity and most recent treatment, multivariate analyses were conducted. Table 3 shows the results of the multivariate logistic regression analysis predicting the likelihood of depression treatment use throughout the study assessment period (any counseling, psychotherapy, or medications: yes/no) from treatment use in the 3 months prior to screening and intervention, initial depression severity (BDI-II scores), and whether or not the physician talked

Table 3. Multivariate Logistic Regression Predicting Any Depression Treatment Use over Time among Prenatal Care-Seeking Women with EPDS[a] ≥ 10 (n = 73)

Parameter	*Estimate*	*Odds ratio*	*95% CI*
Intercept	−2.35	0.09	0.02–0.43
Time point (chi-square (2) = 3.6, p = 0.15)[b]			
Prenatal baseline	−0.65	0.52	0.18–1.45
Prenatal follow-up	0.09	1.10	0.45–2.69
Six weeks postpartum	0.00	0.00	—
Depression severity[c] (chi-square (1) = 4.72, p = 0.03)	0.08	1.10	1.0–1.16
Any treatment prior to screening (chi-square (1) = 11.7, $p < 0.001$)	5.41	222.96	26.6–1881.8
Physician discussion of depression (chi-square (1) = 3.5, p = 0.06)			
No	−1.04		
Yes	0.00		

[a]EPDS, Edinburgh Postnatal Depression Scale.
[b]Omnibus parameter statistics (chi-square).
[c]Based on Beck Depression Inventory-II scores.

with the patient about depression (yes/no). As expected, treatment use prior to screening was a strong predictor of treatment use throughout the study period, as was greater depression severity. Physician discussion of depression approached significance as a predictor of treatment use over time (p = 0.06) with the other variables included in the model.

DISCUSSION

Identification of depression in obstetrics settings may be an important initial step in ultimately providing appropriate treatment for women suffering from depression. Replicating previous studies, the present study supports the feasibility of depression screening in prenatal care setting.[6–9] The EPDS, a brief screening measure, was acceptable to women, as evidenced by the 95% compliance rate with routine clinic screening. Most women with EPDS score ≥ 10 (74%) met criteria for current or lifetime MDD. Most women with current MDD diagnosed during pregnancy were not receiving any form of depression treatment during the 3 months prior to seeking prenatal care (90%), between the initial prenatal care (screening) visit and after their second visit (65%), or at the 6-week postpartum interview (72%). Research on depression screening in general medical settings suggests that improving monitoring and treatment effectiveness for patients with identified MDD might be a better use of scarce healthcare resources than assessment of all patients seeking care.[22,23] The lack of differences in depression outcomes found here between treated and untreated women suggests that any treatments being received may not have been optimal. Thus, one implication is that ongoing assessment of treatment adherence and effectiveness (such as ongoing mood monitoring) of women with identified MDD should be conducted.

We found that 67% of women with EPDS scores ≥ 10 reported that their physician discussed depression with them after screening and physician notification of screening results. Physician discussion of depression was found to be unrelated to either depression severity based on BDI-II scores or MDD diagnostic status as measured by SCID. This finding is consistent with research in primary care settings, suggesting that physician detection of depression may be less associated with the severity of depression than with other factors, such as physical health, comorbidity, patient attitudes about treatment,[24] or psychosocial impairment.[25] Factors associated with the likelihood of clinicians addressing depression in obstetrics settings must be specifically investigated in future studies. Physician discussion of depression did appear to have a moderate impact on treatment seeking, especially at the 1-month prenatal follow-up and even with the relatively small sample size. Specifically, physician discussion nearly doubled the rates of treatment use in the short term (from 14% to 39%), even when key

factors, such as depression severity and history of treatment, were considered. This implies that physician messages may be important in helping encourage treatment for women at a time when they may be more open to health-promoting behaviors.[26] This effect, however, was not observed at the 6-week postpartum assessment. This finding provides preliminary evidence that implementing systematic screening and clinician notification at the prenatal care clinic may help physicians, other clinical staff, and patients pay attention to depression risk and may improve treatment use but does not appear to have affected depression outcomes. This intervention, with modest but observable impact, was feasibly instituted in a busy obstetrics practice, with few additional resources being absorbed to do so. Cost analyses of screening and follow-up procedures implemented in the context of obstetrics care should be conducted in future studies.

Overall rates of treatment use among women with EPDS scores ≥ 10 and MDD remained low (i.e., no more than 35%) and did not appear to impact depression outcomes in the short term. The strongest predictors of treatment use through 6 weeks postpartum in this study were treatment prior to seeking prenatal care and severity of symptoms, consistent with previous studies.[14] Clinicians may wish to use prior mental health treatment experience as an indicator of the likelihood that a woman will follow through with treatment. The impact of ongoing encouragement by obstetrics providers for women with MDD to remain in treatment may be helpful in enhancing treatment adherence and should be specifically tested in future studies. The low treatment rates through 6 weeks postpartum were observed despite the fact that social work and psychiatry clinicians were available on site and that the first mental health appointment was offered for no fee when insurance coverage was not available. This suggests that in addition to external barriers (e.g., lack of transportation, ability to pay), psychological barriers (e.g., stigma, illness and treatment beliefs, depressive symptomatology) may also interfere with pursuit of treatment. Future studies should elucidate the array of possible barriers to seeking depression treatment in the perinatal population. Although screening for depression is a promising and commonly recommended strategy[27] to achieve the goal of improved depression outcomes, the results of this study support the notion that screening alone may not be sufficient. It is likely that more intensive treatment linkage interventions or repeated contacts or both may be needed to significantly improve depression treatment engagement. These results are consistent with depression studies in primary care settings, which indicate that comprehensive and systematic interventions, such as enhanced clinician psychoeducation, systematic follow-up assessment protocols, and timely, coordinated referral with specialty care, are needed to improve treatment engagement and acute depression outcome.[11,28,29]

These results should be considered preliminary for several reasons. One limitation is that whether or not the physician discussed depression was based on patient self-report, without corroboration from the physician. However, whether the patient remembers the conversation may be the prevailing issue. It is not clear from our study design, however, if our screening plus notification intervention had a causal effect on physician discussion of depression during the subsequent visit. Future studies would need to randomly assign patient to screening plus notification compared with no screening control groups[12] in order to elucidate causal factors. Given the small sample size, these results should be used to generate additional research questions concerning depression screening enhancements designed to improve depression treatment rates and subsequent depression outcomes. These findings should be replicated in community, urban, and private clinics comprising of more socioeconomically and racially diverse and larger samples. The differential administration of the baseline interview in person or over the telephone may have introduced some inconsistency in response. However, previous research has suggested no significant difference in validity of administration of depression and other psychiatric measures over the telephone when compared to in-person administration.[30,31]

Another possible limitation to our study is the lack of interreliability calculations for SCID interviews administered. However, all study interviewers successfully completed SCID trainings according to the SCID user guide[17(p88)] and achieved adequate interrater reliability on training interviews. Although we corroborated reports of depression treatment use with medical chart information, we were not able to obtain detailed, reliable information on specific types of treatments being received (e.g., psychotherapy

type). Because the nurse-delivered referral information was not scripted or standardized, we do not have specific details on the precise referral information provided for each woman. Referral information was individualized based on patient preference and requests. The relationship of patient preferences for specific treatments to treatment use and adherence should be specifically evaluated in future studies.

The aim of this study was to examine depression and treatment use during the prenatal and immediate postpartum periods and, therefore, the results do not provide information on the trajectory of postpartum symptoms and impact on treatment use beyond that time frame. Postpartum depression may emerge well beyond 6 weeks after delivery, and symptoms should be monitored on an ongoing basis.[1] This study was limited to the assessment of depression and related treatment use and did not include a more comprehensive assessment of comorbid psychiatric or psychosocial risk, such as anxiety, interpersonal violence, or substance use, all of which may be associated with adverse outcomes[32] and may be assessed feasibly.[33]

This study also elucidates some challenges in studying depression screening programs implemented as part of routine clinical practice. First, just over half of women screened as part of routine care indicated willingness to participate in research when clinic staff administered the screen and initial research consent. Higher rates of participation would be expected if research staff were present to administer the screen and consent forms.[9] This study, however, was designed to have minimal involvement by research staff on site in order to maximize the likelihood of generalizeability of these procedures beyond the research study period. African American and Asian American women were more likely than Caucasian women to refuse participation in the research. Therefore, our findings should only be considered generalizeable to women who agreed to participate in research, noting that no differences in depression scores were found between those who participated and those who refused. It is not clear if racial differences in participation were due to reluctance to participate in research or to address mental health issues (or both). It is important to understand and address barriers to participation, and researchers must continue to work toward optimizing participation of racial/ethnic minorities in studies of untreated perinatal depression.

This study provides preliminary evidence that depression screening in conjunction with obstetrics clinician notification has potential value in improving use of depression treatment and may serve as an important basis from which to begin a discussion about appropriate treatment. More intensive efforts, however, are needed to engage and monitor women with MDD in treatment. Given the recurrent and disabling nature of depression and its negative impact on the health of both the mother and the child, interventions focused on improving treatment adherence among these women are pressing in their need.

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