

Screening and Treatment After Implementation of a Universal Perinatal Depression Screening Program

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OBJECTIVE: To evaluate whether initiation of an institutional policy of universal perinatal depression screening was associated with sustained increases in frequency in screening and of depression treatment subsequent to a positive screen.

METHODS: This retrospective cohort study included women receiving prenatal care in outpatient offices at a single academic medical center from 2008 to 2015. In 2009, an institutional policy of universal perinatal depression screening was disseminated in which screening twice antenatally and again postpartum were recommended. The frequency of screen completion at each recommended time point was compared between the prepolicy and postpolicy cohorts. A test of trend that assessed the frequency of screening each year after policy initiation was used to assess changes over time. The frequency with which care plans were created for

women who screened positive for perinatal depression were compared before and after implementation.

RESULTS: Of the 5,127 women who met inclusion criteria, 4,005 (78%) were in the postpolicy cohort. The frequency of completion of depression screening at the first prenatal visit (0.1% vs 65.5%), in the third trimester (0.0% vs 42.7%), and at the postpartum visit (69.5% vs 90.0%) increased after initiation of the policy ($P<.001$ for all). The improvement in postpartum depression screening completion persisted after controlling for potential confounders (adjusted odds ratio 5.3, 95% CI 4.4–6.5). After the initial increase in uptake of screening, the frequency of screening at the first and third trimester prenatal visits continued to increase over time ($P<.001$ for each), although this frequency remained stable for the postpartum visit ($P=.29$). Women with a positive postpartum depression screen were more likely to have depression treatment recommended or provided by their obstetrician postpolicy (64.7% vs 30.1%, $P<.001$).

CONCLUSION: Implementation of an institutional policy of universal perinatal depression screening was associated with improvements in perinatal depression screening with concomitant improvements in depression treatment recommendations for women with a positive postpartum depression screen.

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Perinatal depression, defined as depression during pregnancy or in the postpartum period, occurs in one out of every seven women.^{1,2} Untreated perinatal depression is associated not only with maternal risks, but with adverse outcomes in the offspring including reduced growth in the fetus, preterm birth, neonatal irritability, and long-term neurobehavioral changes.^{3–7} Nevertheless, perinatal depression remains underdiagnosed and undertreated.^{8,9}

One approach to improving outcomes is through universal screening in pregnancy. However, even in

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the setting of universal screening, barriers to provision of mental health care remain. For example, obstetricians often report that their inadequate training in psychiatry and lack of resources to facilitate referrals are strong barriers to delivering quality perinatal mental health care.¹⁰ In addition, patient-perceived stigma as well as logistical barriers to multiple separate appointments impede adherence to mental health care recommendations. These limitations markedly affect adequate care provision: for example, only half of pregnant women identified as depressed accept a mental health care referral and fewer than 10% remain in any treatment at 6 months after the initial diagnosis.⁸

The American College of Obstetricians and Gynecologists (ACOG) recently updated its perinatal depression guideline to include a recommendation for screening “at least once during the perinatal period.”¹¹ Furthermore, ACOG emphasizes the importance of establishing a diagnosis and initiation of treatment, if indicated, once a positive screen is identified. Whether such a policy recommendation is associated with sustained improvements in screening frequency, indicated mental health service utilization, and enhanced outcomes remains uncertain.^{12–14}

Thus, in this study, we sought to evaluate whether initiation of an institutional policy of universal perinatal depression screening was associated with sustained increases in frequency in screening and of depression treatment subsequent to a positive screen.

METHODS

In January 2008, the State of Illinois enacted the Perinatal Mental Health Disorders Prevention and Treatment Act (P.A. 095-0469). This mandate requires that obstetric providers: 1) provide education regarding perinatal depression during prenatal and postdelivery care and 2) screen women for perinatal mental health disorders during prenatal and postnatal care (State of Illinois, Public Act 095-0469, <http://ilga.gov/legislation/publicacts/fulltext.asp?Name=095-0469>). In response, a partnership between the Departments of Obstetrics and Gynecology and Psychiatry and Behavioral Sciences at Northwestern University was established. Perinatal mental health experts within both Departments developed a standardized assessment protocol for all patients receiving perinatal care from providers affiliated with Northwestern Memorial Hospital.

The protocol (Appendix 1, available online at <http://links.lww.com/AOG/B442>) included a recommendation for screening women for depression using the 9-item Patient Health Questionnaire at the first prenatal visit, in the early third trimester (28–32 weeks

of gestation), and at the postnatal visit (6 weeks postpartum). Clinical assessment of screen-positive women (9-item Patient Health Questionnaire of 10 or more) included a diagnostic evaluation by the obstetrician followed by initiation of a treatment plan. Treatment resources were disseminated at Grand Rounds as well as electronically. The information provided included education on evidenced-based selective serotonin reuptake inhibitor pharmacotherapy counseling and dosing as well as an emphasized commitment for perinatal psychologists and psychiatrists at Northwestern to be made available for referrals for women identified to have perinatal depression. This protocol was presented at Departmental grand rounds, at which educational material on treatment as well as referral resources were provided. Departmental champions of the screening protocol were identified to assist with implementation.

Women who presented to prenatal care at ambulatory practices Northwestern University employed physicians from January 1, 2008, to December 31, 2014, were included in this retrospective cohort study. These practices include both obstetrician specialists and maternal–fetal medicine subspecialists, as well as residents and fellows. Women who presented for initial obstetric care after 24 weeks of gestation and women who delivered before 24 weeks of gestation were excluded from analysis given the reduced opportunity for screening. To include only those women whose entire pregnancies occurred before or after the policy implementation, the study cohorts include those who delivered between January 1, 2008, and January 30, 2009 (prerecommendation group), and those who delivered between December 1, 2009, and December 30, 2014 (postrecommendation group).

Women were identified through a query of the hospital’s clinical database, which includes information derived from all electronic medical records and other hospital information systems. Charts were abstracted for demographics and baseline clinical information including maternal age, race–ethnicity, parity, prepregnancy body mass index (BMI, calculated as weight in kilograms divided by height in meters squared), and medical comorbidities. Delivery information, including gestational age at delivery, route of delivery, neonatal birth weight, and any complications were abstracted as well. No imputation for missing data was done for analyses.

Characteristics of depression screening—the administration of the screen, the result, and the gestational age or postpartum week when the screening was performed—were abstracted by manual review



of the prenatal record. For women with a positive screen, the resulting clinical assessment and any recommendation for treatment made by the obstetrician (operationalized as documentation of either medication initiation or a referral to mental health services) were recorded. Comparisons of depression-screening adherence and development of perinatal depression treatment plans were made between women in the prepolicy and postpolicy periods using χ^2 analyses. A multivariable logistic regression included variables that significantly differed in the prepolicy and postpolicy cohorts. The multivariable analyses were used to estimate the independent association of screening completion with implementation of the protocol. Nonparametric tests of trend were used to assess whether frequency of adherence to the protocol continued to increase over time after the policy was implemented.

Approval for this study was obtained from the Northwestern University Institutional Review Board with a waiver of informed consent. All hypotheses tests were two-tailed and $P < .05$ was used to define statistical significance. All statistical analyses were performed using Stata 14.0. With an estimated baseline postpartum depression screening rate of 60% and an anticipated 4:1 postpolicy:prepolicy ratio of women receiving care in each period, 4,000 women and 1,000 women, respectively, would be needed to detect at least a 10% absolute improvement in screening associated with implementation of the policy. Furthermore, preliminary data from our institution demon-

strate that 25% of those with a positive screen have moderate to severe symptoms, and thus are likely candidates for initiation of treatment. Based on existing literature demonstrating a 20% baseline depression treatment rate in the setting of a positive screen,¹⁵ this sample size provides 80% power to detect a 10% absolute increase in the development of a documented treatment plan associated with a universal screening policy. We projected that 6 years of prenatal records would allow us to obtain the targeted sample size.

RESULTS

During the study period, there were 6,966 women who received prenatal care in the eligible prenatal clinics. Of these women, 709 (10%) presented for prenatal care after 24 weeks of gestation, 24 (0.3%) delivered before 24 weeks of gestation, and 1,106 (16%) had the policy transition occur in the midst of their pregnancy, leaving 5,127 women who met inclusion criteria. Women in the postpolicy epoch were younger, more likely to belong to a racial-ethnic minority, have public insurance, have a medical comorbidity, and be multiparous. Women in the postpolicy epoch also had a larger prepregnancy BMI (Table 1).

Perinatal depression screening at the first prenatal visit (0.1% vs 65.5%, $P < .001$) and in the third trimester (0.0% vs 42.7%, $P < .001$) increased after implementation of the policy. Similarly, postpartum depression screening improved (69.5% vs 90.0%, $P < .001$) after

Table 1. Characteristics of the Study Population Before and After Perinatal Depression Screen Policy Implementation

Characteristic	Prepolicy (n=1,122)	Postpolicy (n=4,005)	P
Maternal age (y)	31.5±5.7	30.8±5.8	<.001
Race-ethnicity (n=4,561)			<.001
Non-Hispanic white	494 (49.2)	1,264 (35.6)	
Non-Hispanic black	236 (23.5)	1,171 (32.9)	
Hispanic	144 (14.3)	747 (21.0)	
Asian	70 (7.0)	244 (6.9)	
Other	61 (6.1)	130 (3.7)	
Public insurance	253 (22.6)	1,870 (46.7)	<.001
Medical comorbidity*	371 (33.1)	1,639 (40.9)	<.001
Nulliparous	544 (48.5)	1,463 (36.5)	<.001
Prepregnancy BMI (kg/m ²) (n=3,691)	24.1 (21.4–28.4)	24.9 (21.9–30.0)	<.001
Gestational hypertension or preeclampsia (n=5,123)	62 (5.5)	205 (5.1)	.587
Gestational age at delivery (wk) (n=5,123)	39.1 (38.3–40.0)	39.1 (38.3–40.0)	.645
Preterm delivery	115 (10.3)	401 (10.0)	.816
Fetal or neonatal death (n=5,123)	3 (0.3)	13 (0.3)	>.99

BMI, body mass index.

Data are mean±SD, n (%), or median (interquartile range) unless otherwise specified.

* Defined as present if history of diabetes, thyroid disease, epilepsy, kidney disease, anemia, pulmonary disease, heart disease, hypertension, thrombosis, or autoimmune disorder.



Table 2. Multivariable Analysis for the Outcome of Postpartum Depression Screening

	OR	95% CI	aOR*	95% CI
Postpolicy epoch	4.0	3.3–4.7	5.4	4.4–6.5
Maternal age (y)	1.1	1.1–1.1	1.0	1.0–1.1
Race–ethnicity				
Non-Hispanic white	1.0	Ref	1.0	Ref
Non-Hispanic black	0.5	0.4–0.6	0.8	0.7–1.2
Hispanic	0.6	0.5–0.8	0.9	0.7–1.6
Asian	1.0	0.7–1.5	1.0	0.7–1.6
Other	0.5	0.3–0.7	0.7	0.5–1.1
Public insurance	0.3	0.3–0.4	0.3	0.3–0.4
Medical comorbidity*	1.1	0.9–1.3	1.0	0.9–1.2
Nulliparous	1.2	1.0–1.5	1.5	1.2–1.8
Prepregnancy BMI	1.0	1.0–1.0	1.0	1.0–1.0

OR, odds ratio; aOR, adjusted odds ratio; BMI, body mass index.

* Adjusted for all of the listed covariates.

implementation of the policy. The association of epoch with depression screening in the first and third trimester could not be assessed in multivariable analyses given that the equations would not converge with so few events in the prepolicy epoch. However, the improvement in postpartum depression screening continued to show significant improvement (adjusted odds ratio 5.4, 95% CI 4.4–6.5) even after controlling for potential confounders (maternal age, race–ethnicity, insurance, medical comorbidities, parity, prepregnancy BMI) (Table 2). The rates of antenatal screening (at both time points) improved during the postpolicy period ($P<.001$ for first prenatal visit

screen, $P<.001$ for third-trimester screen), whereas the frequency of postpartum depression screening completion remained stable ($P=.291$) after implementation of the policy (Fig. 1 and Table 3).

Of women who were screened for antenatal depression, 226 (8.6%) screened positive at the first prenatal visit, 112 (6.6%) screened positive in the third trimester, and 36 (1.2%) screened positive at both the first prenatal visit and again in the third trimester. As antenatal screening was so rarely performed prepolicy, the postpolicy groups were used to analyze recommendations after a positive depression screen. Of women who screened positive at the first prenatal visit, 15 (6.6%) did not have a documented discussion of their depression screen with their obstetrician, 86 (38.1%) were not considered by their obstetrician to meet criteria for perinatal depression, seven (3.1%) declined recommended intervention, and 118 (52.2%) received a documented mental health referral or a prescription for pharmacotherapy.

Of women screened postpartum, 229 (5.9%) screened positive. The prevalence of obstetrician recommendation for mental health treatment after a positive screen increased after the perinatal depression screening policy ($P<.001$) and after the institution of the policy these changes remained stable over time (Table 4, nonparametric test of trend for obstetrician recommendation for mental health treatment after positive screen $P=.066$).

After accounting for the frequency of attendance at the postpartum visit, screening rates, and the

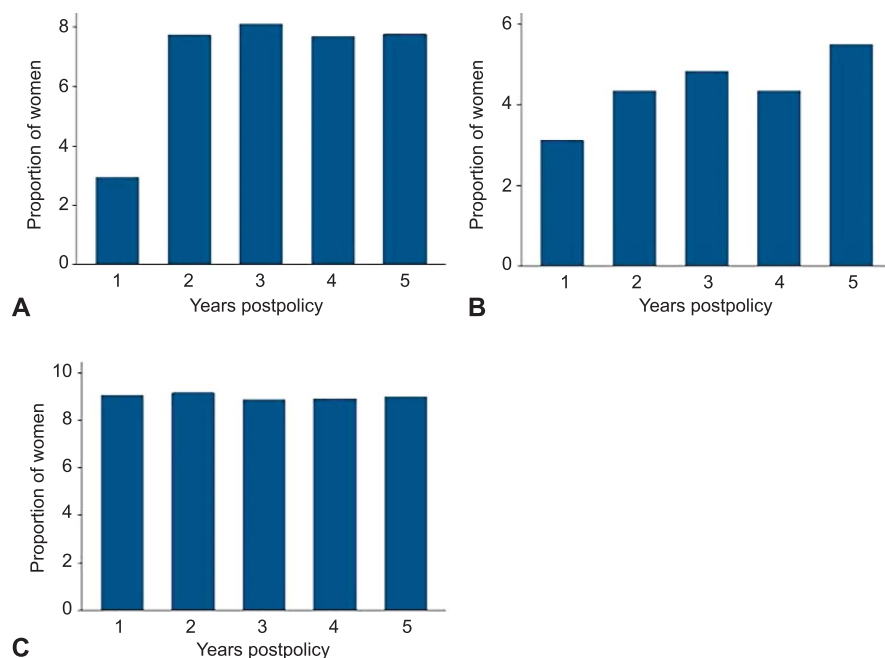


Fig. 1. Proportion of women screened for depression each year after perinatal depression screen policy implementation. The proportion of women screened for depression at the first prenatal visit improved over time postpolicy ($P<.001$) (A). The proportion of women screened for depression in the third trimester improved over time postpolicy ($P<.001$) (B). The proportion of women screened for depression postpartum remained stable over time postpolicy ($P=.291$) (C).

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Table 3. Proportion of Women Screened for Depression Before and Each Year After Perinatal Depression Screen Policy Implementation

Screening Time Point	Prepolicy	Years Postpolicy				
		1	2	3	4	5
First prenatal visit	1 (0.1)	307 (29.4)	795 (77.4)	588 (81.1)	486 (76.7)	443 (77.7)
Third trimester	0 (0.0)	326 (31.1)	446 (43.4)	350 (48.3)	275 (43.4)	314 (55.0)
Postpartum	780 (69.5)	834 (90.2)	813 (91.5)	557 (88.4)	467 (89.0)	422 (89.8)

Data are n (%).

response to a positive screen, approximately 34% of women with antenatal depression and 32% of women with postpartum depression would receive a recommended intervention for mental health treatment (Fig. 2 and Table 5).

DISCUSSION

Results from this cohort study demonstrate that dissemination and education of a policy of perinatal depression screening is associated with improvements in adherence to recommended screening recommendations. Furthermore, these improvements in screening translate to improvements in depression treatment for women who are screened positive. Nevertheless, even in the postpolicy epoch, significant barriers to perinatal mental health care appeared to remain. With an estimated 600,000 women affected with perinatal depression each year in the United States^{1,2,16} and approximately only one-third receiving a recommended intervention, this translates to approximately 400,000 affected women without treatment annually.

Strengths of this study include its sample size, which allowed us to detect modest but clinically significant improvements in the frequency of perinatal depression screening and treatment. Our study is also strengthened by the detailed chart review, which allowed not only the identification of screening completion, but also the detection of a documented care plan. One limitation of this study is its observa-

tional design and thus secular changes over time may have led to unmeasured confounding bias. For example, during the study period, several clinics transitioned to a different electronic medical record and this charting change may have led to patient-level demographic data to be selectively missing in earlier epochs. A second limitation of this project is its performance in a single center, which limits external generalizability. Specifically, the resources at a university center may not reflect those available at a community or rural program, and thus extrapolation of these results to all settings is limited.

These findings have direct relevance to obstetric care throughout the United States, given that guidelines from ACOG and the U.S. Preventive Services Task Force recommend screening for perinatal depression both antenatally and postpartum.^{11,17} Furthermore, the Council on Patient Safety emphasizes that perinatal depression is a significant maternal safety issue and recommends not only universal screening but also development of a systematic approach and culture of safety regarding perinatal depression.¹⁸ Our findings emphasize that dissemination of and education regarding these guidelines is important, as screening and treatment is significantly enhanced subsequent to these actions. However, our findings also emphasize that these recommendations alone are not sufficient to optimize perinatal mental health care, likely related to the multiple obstacles (eg, logistic barriers to appointments,

Table 4. Documentation of Mental Health Care Evaluation in the Postpartum Period, Stratified by Policy Epoch

	Prepolicy (n=113)	Postpolicy (n=116)	P
Mental health care evaluation and plan			<.001
None	13 (11.5)	6 (5.2)	.08
Present			
Patient not considered to meet criteria for perinatal depression by obstetrician	56 (49.6)	29 (25.0)	<.001
Patient declined referral or pharmacotherapy	9 (8.0)	6 (5.2)	.39
Patient accepted referral or pharmacotherapy	35 (30.1)	75 (64.7)	<.001

Data are n (%) unless otherwise specified.



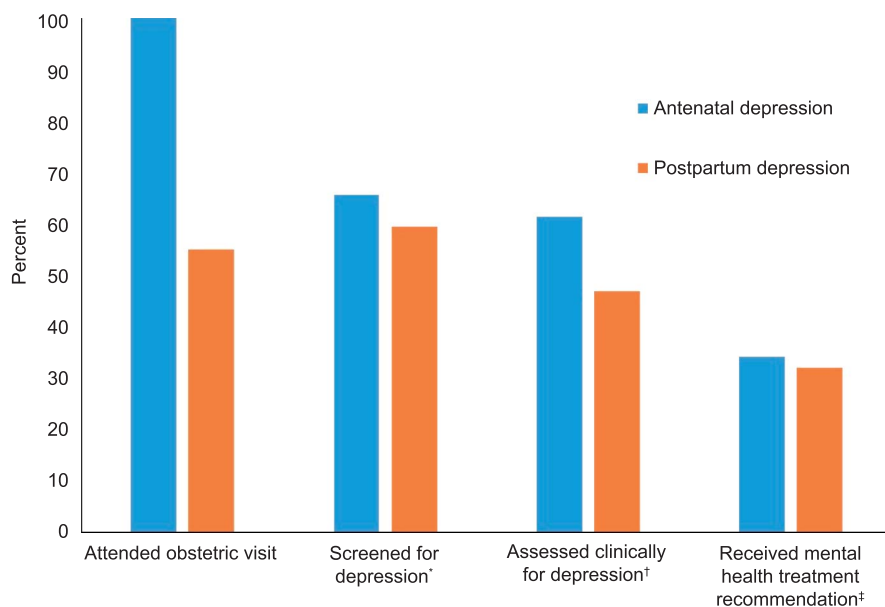


Fig. 2. Percentage of women engaged in select stages of the perinatal mental health care continuum. *Calculated as the percentage of women who attended obstetric visit×the percentage screened for depression postpolicy. †Calculated as the percentage of women screened for depression×the percentage assessed clinically for depression postpolicy. ‡Calculated as the percentage of women clinically assessed for depression×the percentage who received a mental health treatment recommendation postpolicy.

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stigma toward mental health treatment) that exist. Moreover, our data likely overestimate the frequency of actual mental health treatment that occurred, because we were unable to confirm whether referrals were followed or prescriptions filled owing to limitations within our routine clinical charting.

Strategies to mitigate gaps in perinatal depression treatment are critical. The Council on Patient Safety recommends development of a perinatal mental health referral list at each site to facilitate expeditious treatment for a woman identified to have perinatal depression.¹⁸ Other resources, such as the MCPAP for Moms (Massachusetts Child Psychiatry Access Project for Moms) Toolkit (<https://www.mcpapformoms.org/Toolkits/Toolkit.aspx>) and MotherToBaby (<https://mothertobaby.org/>),

are freely available to educate obstetricians on prescribing antidepressant pharmacotherapy.

Additionally, pragmatic and scalable models of mental health care delivery, such as integrated or collaborative care, have been demonstrated to result in improvements in screening, diagnosis, and treatment in nonobstetric primary care settings.^{19,20} Recent randomized trials have shown similar improvements during obstetric care.^{21,22} Although these data demonstrate efficacy, cost-effectiveness has not been demonstrated. Whether formalized collaborative care models that require care managers, population registries, and stepped care algorithms are superior to screening and treatment policy implementation programs is unclear.

Table 5. Percentage of Women Engaged in the Perinatal Mental Health Care Continuum Before and After the Protocol Implementation

	Preprotocol	Postprotocol	
	Postpartum Depression	Antenatal Depression	Postpartum Depression
Attended obstetric visit	54.9	100	54.9
Screened for depression*	38.1	65.5	59.4
Assessed clinically for depression†	33.7	61.2	46.8
Received mental health treatment recommendation‡	10.1	34.1	31.9

Data are %.

Antenatal depression care continuum not reported prepolicy owing to near absence of screening.

* Calculated as the percentage of women who attended obstetric visit×percentage screened for depression postpolicy.

† Calculated as the percentage of women screened for depression×percentage assessed clinically for depression postpolicy.

‡ Calculated as the percentage of women clinically assessed for depression×percentage who received a mental health treatment recommendation postpolicy.



Notably, our observed frequency of a positive postpartum depression screen (5.9%) was lower than has been reported.² One source of this discrepancy could be that women with postpartum depression are less likely to attend their postpartum visit. Future implementation research on postpartum depression screening should include a focus on postpartum visit attendance with interventions such as patient navigation as a means to improve population-based postpartum depression screening.²³

In summary, implementation of a perinatal depression screening policy resulted in improvements in screening as well as improvements in linkage to mental health care. Although this represents one step forward, the majority of women with perinatal depression will continue to fall through remaining gaps in the screening and treatment cascade. Future implementation research is required to identify optimal practice with respect to perinatal depression.

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