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2013

The Association Between Prenatal Depression and Mental Health Treatment Among Birth Outcomes

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Abstract

Women are more susceptible to depression than men and depression around the childbearing years has shown to have deleterious birth outcomes. This study investigated the associations between depression and mental health treatment among particular birth outcomes. Participants included a total of 611 pregnant women, from two separate obstetrics clinics in the southeast, who completed the PHQ-9, a depression screening measure. Birth outcome information was gathered via medical record search and completed on all subjects. About 12% of women scored above the cutoff for elevated depression. Significant differences between education, race, and income were found among most birth outcomes. No association was found between depression, mental health treatment, and birth outcomes, but those who had adverse birth outcomes rated higher in terms of severity on particular depressive symptoms of the PHQ-9. Though the possible effectiveness of mental health treatment was not observed based on this cross-sectional study, future research should aim at understanding the role treatment has during pregnancy to treat depression and its relationship to relative birth outcomes.

Keywords: prenatal depression, pregnancy, mental health treatment, PHQ-9, birth outcomes

THE FLORIDA STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

THE ASSOCIATION BETWEEN PRENATAL DEPRESSION AND MENTAL HEALTH TREATMENT AMONG BIRTH OUTCOMES

By

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A Thesis submitted to the
Department of Psychology
in partial fulfillment of the requirements for graduation with
Honors in the Major

Degree Awarded:
Spring Semester, 2014

The members of the Defense Committee approve the thesis of Nicole M. McBride defended on December 2, 2013.

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The Association Between Prenatal Depression and Mental Health Treatment Among Birth Outcomes

The Centers for Disease Control and Prevention (CDC) estimates that one of every ten adults in the U.S. are currently depressed (CDC, 2010). Studies show that depression is a leading cause of disease-related disability and, if left untreated, can have detrimental effects on one's health (Kessler et al., 2003; Moussavi et al., 2007). Major depressive disorder (MDD) and elevated depressive symptoms are more common in women than in men (CDC, 2010; Kessler, 2003), with particular susceptibility around the childbearing years (Gaynes et al., 2005). Research has demonstrated that 20% of pregnant women reported elevated depressive symptoms and majority of those women had never received any formal treatment (Marcus, Flynn, Blow, & Barry, 2003). Depression around the childbearing years has been associated with increased pregnancy or labor complications, infant developmental issues, premature delivery, and low birth weight (Chia-Hui & Herng-Ching, 2011; Davalos, Yadon, & Tregellas, 2012; Parcells, 2010; Steer, Scholl, Hediger, & Fischer, 1992). However, there is difficulty in detecting MDD or depressive symptoms during pregnancy because some of the challenges in pregnancy overlap with the symptoms of depression (Klein & Essex, 1994).

Once depressive symptoms are evident in pregnant women, the management and treatment of that depression can be complicated. It is first important that women receive treatment to aid in the reduction of their symptoms; however, many pregnant women do not seek or ever receive treatment (Marcus et al., 2003). Despite low treatment rates, when women do decide to receive or seek treatment, two typical options are available to them (i.e., psychotherapy and psychiatric medication). Both of these treatment options have shown to alleviate depressive

symptoms among pregnant women (Bonari et al., 2004; Spinelli & Endicott, 2003), but pregnancy outcomes of each have not been studied entirely.

Psychotherapy, such as cognitive behavioral therapy and interpersonal therapy, seem to be the most frequently used treatment approach when depressed pregnant women do not want to take medication (Brandon & Freeman, 2011), however it has shown to be less effective for severe depression (Raudzus & Misri, 2009). It is also the suggested form of treatment due to the lack of health related risks associated. Unfortunately, there is little research focused on pregnancy and delivery outcomes among depressed pregnant women who receive psychotherapy (Bonari et al., 2004). Most studies focus on the pharmacological aspect and the teratogenic effects medications have, which leaves most women refusing treatment because of the adverse outcomes associated (Bonari et al., 2004). However, studies have found that among prenatally depressed women, those who received interpersonal psychotherapy were able to reduce their depressive symptoms (Field et al., 2009; Spinelli & Endicott, 2003), and even more so when they received massage therapy (Field et al., 2009). However, no follow up was conducted to study pregnancy outcomes in either of these studies. It does seem as though psychotherapy during pregnancy does alleviate depressive symptoms, but few studies have compared pregnancy outcomes among depressed women who received psychotherapy versus medication.

Aside from psychotherapy, psychiatric medication is another form of treatment. Medications, such as antidepressants, are typically patients' and physician's first choice (Raudzus & Misri, 2009), but some have shown to be associated with adverse infant outcomes if taken during pregnancy (Jensen et al., 2013). Although almost all pregnant women will be exposed to some type of medication throughout their pregnancy, it takes rigorous amounts of investigations and research to deem that medication safe to the mother and fetus (Koren,

Pastuszak, & Ito, 1998). Clinical drug research is underdeveloped in the area of pregnancy safe medications and there is little information on the efficacy of current medications being prescribed for depression and whether these medications could be teratogenic (Buhimschi & Weiner, 2009; Koren et al., 1998; Lagoy, Joshi, Cragan, & Rasmussen, 2005). It is advised that clinicians stay up to date with information when prescribing psychiatric medication to pregnant women (Buhimschi & Weiner, 2009; Raudzus & Misri, 2009) and perform research to better quantify the fetal and pregnancy consequences of treatment exposure as it is understudied. Regarding the difficult decision that depressed pregnant women face when thinking about treatment, there are several options that need to be discussed with their health care provider or physician to determine the optimal decision (Wisner et al., 2000).

There are many unknown and known factors that may cause pregnancy and infant complications, but if evidence suggests that receiving mental health treatment when depressed during pregnancy is associated in the reduction of those complications, then this emphasizes the need of onsite interventions to improve perinatal depression treatment. The time when most women visit the hospital is during pregnancy and this is surely not the time for clinicians to ignore depression screening (Gaynes et al., 2005). Many studies have used various depression screening measures (e.g., CES-D, EPDS, PDSS), but no use of a standardized method has been implemented (Gaynes et al., 2005). A standardized method of depression detection would allow more results to be compared from separate studies, and then standardized interventions could be designed (Gaynes et al., 2005; Marcus et al., 2003). From these interventions, it would allow clinicians to decide if treatment is necessary to treat their symptoms and what type would be best.

Purpose

Understanding the strength of the association between mental health treatment and pregnancy outcomes is important when discussing treatment recommendations for depressed pregnant women. The purpose of this study was to examine the association of depression and mental health treatment (i.e, psychotherapy and psychiatric medication) during pregnancy. Two hypotheses were tested in this study: (1) depression would be associated with adverse birth outcomes and (2) those who did not receive mental health treatment would be more likely to have adverse birth outcomes, while controlling for depression. Few studies focus on pregnancy outcomes when treatment for depression during pregnancy was provided and even fewer when that treatment was psychotherapy. This study adds to a limited body of literature exploring associations between birth outcomes and mental health treatment received during pregnancy. Focusing on the associations mental health treatment has with birth outcomes has important implications for future recommendations of treatment during pregnancy.

Method

Study Design

This study was conducted as ancillary to a Florida State University College of Medicine parent project. That overall research program is aimed at addressing the lack of effective and sustainable strategies to improve depression care and birth outcomes in obstetrics in the United States. The specific goal of the research program is to provide information on implementation of feasible interventions to improve perinatal depression treatment engagement and outcomes in the obstetrics setting among underserved women. The research program and protocol was approved by Florida State University's Institutional Review Board.

The sample for this ancillary study was collected at two separate obstetrical clinics in two different ways and then merged together based on common variables after data collection was finalized. At the first obstetrical clinic site, located in North FL, participants were pregnant women aged 18 years or older, who were approached by trained research assistants to complete a brief 27 item screening tool while they waited for their appointment. A daily obstetrics appointment list was given to research assistants on days of the week staffed by the researchers. Research assistants approached every women over age 17 on the appointment list for the day regardless of their gestational age. Data were collected from August 2012 to July 2013. The screening tool used was developed to gather a short summary of characteristics concerning pregnant women's emotional health and mental health treatment use. All responses collected from consenting women were de-identified to ensure confidentiality. A medical record search was conducted at the same clinic by trained research assistants for all the women who completed the screening tool to extract information related to their pregnancy, delivery, and infant outcomes.

The second obstetrical clinic was located in Northwest FL and data was collected using only medical record extraction. The medical record included the same depression screening tool that was administered at the first clinic, which had been administered by clinic staff prenatally. Trained research staff extracted all relevant pregnancy, labor, and delivery information from the participants' medical records from the years of 2010-2012. Information gathered from these participants' medical records were their race, education, depression screening tool scores, and information related to pregnancy, labor, and delivery.

Measures

The screening tool consisted of 27 items and included assessment of the variables described below.

Demographics. The screening tool used consisted of wide range of demographics. Demographic information included age, ethnicity, race, marital status, employment status, education, total household income, and gestational age at the time they completed the tool. Due to no screening tool administered in the Northwest FL clinic, only race and education were the demographic variables that could be extracted from participants' medical records. Appropriate re-coding of demographic variables was performed to supplement analyses.

Mental Health Treatment and Depression. The screening tool assessed current mental health treatment and history of use. The tool also assessed the prevalence of lifetime depression. In addition, participants were asked about previous diagnoses of depression and if that diagnosis was within one year of having a baby or while pregnant. Items assessed current mental health treatment (i.e., currently receiving any psychotherapy or psychiatric medication) and were chosen to represent any current mental health treatment as yes or no. To assess current depression status, the Patient Health Questionnaire-9 (PHQ-9) was used. The PHQ-9 has been shown to be a reliable and valid comparable measure of the DSM-IV criteria based diagnoses of depression (Kroenke, Spitzer, & Williams, 2001). The PHQ-9 was designed for brevity, as it was based off of the original three page PHQ (Kroenke et al., 2001). The nine items gather a concise snapshot about depression symptom severity and a possible insight to depression diagnoses. Each of the nine items corresponds to a depressive disorder criteria as stated in the DSM-IV and participants can rate their severity of that symptom on a scale of zero to three. Research suggests that individuals with diagnosed depression are 7.1 times likelier to score a ten or greater on the

PHQ-9 than individuals without depression, therefore establishing a cutoff of moderate to severe depression sensitivity and severity (Kroenke & Spitzer, 2002). A cutoff of ten or greater was used to operationalize participants as currently depressed.

Birth Outcomes

For the purposes of this study, only four birth outcomes were analyzed from the wide array of information collected during medical record extraction. First, the presence of one or more pregnancy, labor, or delivery complication was used to operationalize the variable complications (see Appendix A for an example of complications used). This variable was analyzed dichotomously (e.g., yes means the presence of one or more complications). The second was the gestational age of women at the time of delivery to determine premature delivery. Premature delivery was operationalized as giving birth earlier than 36 weeks and six days, which has been suggested to be a reliable indicator that an infant is not fully developed (American College of Obstetricians and Gynecologists, 2013; World Health Organization [WHO], 2010). Severe health problems at the time delivery (e.g., respiratory distress) and developmental disorders have been shown to be associated with infants born prematurely and therefore is an important factor for infant health (Reading, 2002; Wang, Dorer, Fleming, & Catlin, 2004). The third birth outcome was the birth weight of the baby analyzed on a continuous scale in grams. Research has shown that a birth weight of less than 2,500 grams suggests problematic health and developmental issues in the future because the infant is not fully developed (Boulet, Schieve, & Boyle, 2011; WHO, 2010). As birth weight and premature delivery have shown to be correlated, similar problematic outcomes exist between the two (Boulet et al., 2011). The fourth birth outcome analyzed was the five minute appearance, pulse, grimace, activity, respiration (APGAR) score, which is based on a scale of zero to ten. The five minute APGAR score has

been proven to be a reliable indicator of infant health and mortality (Casey, McIntire, & Leveno, 2001; Li et al., 2013; Haddad & Green, 2011). A score between zero and six is an indication of poor infant health and the lower the score is more medical attention is necessary (Casey et al., 2001; Haddad & Green, 2011).

Analyses

All relevant descriptive information was summarized. Bivariate statistics were used to examine associations among demographics, depression, and mental health treatment with all birth outcomes. Chi square tests, one way ANOVAs, and independent *t*-tests were used to examine bivariate differences between dichotomous and continuous variables (respectively). Two block logistic regression models were used to examine the association between depression status and mental health treatment with dichotomous birth outcomes (i.e., any complications and premature delivery). Two regression analyses were used to examine the association between depression and mental health treatment among five minute APGAR score and birth weight. Variables which were significant at the bivariate level were included in multivariable analyses to control for differences. Analyses were used to further examine the association between individual depression symptom items and birth outcomes. All analyses were performed using SPSS version 21 statistical program and evaluated at the $p < .05$ significance level. Certain analyses were performed separately for the two clinic sites due to the different data collection methods used, and where appropriate (i.e., overlapping variables and methods) analyses were combined for the two clinics.

Results

Sample Description

A total of 611 pregnant women (44.4% North FL clinic; 55.6% Northwest FL clinic) were used in the present analyses. At the North FL clinic, the age of the women ranged from 18 to 41, with a mean age of 28.17 (*SD* = 5.46) and a mean gestational age of 23.01 weeks (*SD* = 12.26) at the time of administration of the screening tool. In Table 1, a breakdown of demographic information is displayed. Ethnicity of women from the North FL clinic was predominantly non-Hispanic. In Table 1, it is shown that race, which was combined from both clinics, was predominantly White and most women had a high school education or GED. When analyzed separately, 59.9% of participants from the North FL clinic were White (30.5% Black/African American, 9.7% Other), while race from the Northwest FL clinic was almost evenly distributed (45.6% White, 45.2% Black/African American, 9.2% Other). Majority of women from the North FL clinic were full-time employed and married, who had a total household income of $70,000 or higher. Majority of women from the North FL clinic had a high educational status (4.1% less than high school, 11.6% high school graduate or GED, 30.2% some college, 34% college graduate, 20.1% beyond college graduate). Most women (57.6%) from the Northwest FL clinic had their high school degree or GED (7.6% some college, 9.7% college graduate or beyond).

Prevalence of Depression and Mental Health Treatment

As can be seen in Table 1, 4.4% of the entire North FL clinic sample were receiving mental health treatment at the time they completed the screening tool. Of that 4.4%, 50% said yes to psychiatric medication, 33% said yes to counseling or psychotherapy, and 17% said yes to both. The rate of reported lifetime depression was 34% and 17.8% stated they had been

diagnosed with depression. Of those who stated they had been diagnosed with depression, 29% received that diagnosis within one year of having a baby or while pregnant.

The average PHQ-9 among both clinics was 4.58 (*SD* = 4.19), with 11.9% women scoring above or equal to a 10. The average PHQ-9 from the North FL clinic was 3.96 (*SD* = 3.59), with 6.4% women scoring above or equal to a 10. The average PHQ-9 from the Northwest FL clinic was 5.11 (*SD* = 4.58), with 16.6% women scoring above or equal to a 10.

Birth Outcome Rates

The rate of a pregnancy, labor, or delivery complication was evenly distributed across both clinics (49.5% reported one or more complications) and 11.8% classified as having a premature delivery. The average birth weight was 3,241.63 grams (*SD* = 542.74), and 9.8% of women gave birth to a baby less than or equal to 2,500 grams. The average five minute APGAR score was 8.87 (*SD* = 0.69), and 1.1% of women had a baby that scored less than or equal to a six.

For just the women from the North FL clinic, 30.8% had one or more pregnancy, labor, or delivery complications, and 6.7% classified as giving birth to a baby prematurely. The average birth weight was 3,338.63 grams (*SD* = 496.72), and 5.5% of the women gave birth to a baby less than or equal to 2,500 grams. The average 5 minute APGAR score was 8.92 (*SD* = 0.76), and 0.9% of women had a baby that scored less than or equal to a six.

Bivariate Analyses

Across both clinics, there were no significant differences in rates of complications by any demographic variables, except education ($X^2(4) = 29.48$, $p < .001$) where most women (62.2%) with a high school education had the presence of one or more complications. There was also a significant difference in the distribution of education across premature delivery ($X^2(4) = 22.23$, *p*

< .001), where most women with a premature delivery were high school graduates or had their GED. Race demonstrated significant differences among birth weight ($F(2, 544) = 15.37$, $p <$ .001), with Blacks/African Americans exhibiting the lowest average birth weight ($M = 3083.46$, $SD = 521.40$). There were no significant differences in rates of five minute APGAR scores by demographic variables.

Analyzing only women from the North FL clinic, race was the only demographic variable that demonstrated significant differences among rates of complications ($X^2(2) = 6.21$, $p < .05$). There were no significant differences in rates of premature delivery by demographic variables. Income demonstrated significant differences among birth weight ($F(2, 220) = 3.45$, $p < .05$), with an income of $0-$29,999 exhibiting the lowest average birth weight (3191.79 g, $SD = 532.61$). Race demonstrated significant differences among birth weight as well ($F(2, 250) = 5.64$, $p <$ .01), with those identifying as Black/African American having the lowest average birth weight (3182.79 g, $SD = 521.85$). There were no significant differences in rates of 5 minute APGAR scores by demographic variables. There were no significant differences in rates of PHQ-9 scores or current mental health treatment and the four birth outcomes.

Multivariable Analyses

Results of the block logistic regression methods are presented in Table 2. The results of all three models of the logistic regression for birth complications were not found to be statistically significant. Race was included to control for differences as it was statistically significant at the bivariate level. In Table 2, the logistic regression models for premature delivery were not statistically significant.

Results of the block linear regression methods are presented in Table 3. In Table 3, the results of the models of the linear regression for birth weight were not statistically significant. In

Table 3, the results of both models of the linear regression for five minute APGAR score were not statistically significant.

Supplemental Analyses

As depression score on the PHQ-9 was not associated with any birth outcomes, individual analyses were conducted with individual depression symptom items on the PHQ-9 for the entire sample. Those who had a complication had a higher mean score ($M = 0.64$, $SD = 0.89$) on the "lack of interest/pleasure" item of the PHQ-9 than those who did not have a complication ($M = 0.49$, $SD = 0.81$, $t(519.68) = -1.96$, $p < .05$). Those who had a premature delivery had a higher mean score ($M = 0.28$, $SD = 0.69$) on the "psychomotor agitation" item of the PHQ-9 than those who did not have a premature delivery ($M = 0.09$, $SD = 0.38$, $t(64.68) = -2.12$, $p < .05$). No significant differences were demonstrated between birth weight and PHQ-9 items. For five minute APGAR scores, there were significant differences among scores for the "psychomotor agitation" item ($F(3, 523) = 3.38$, $p < .05$), with those answered with "nearly every day" having a lower average APGAR score ($M = 8$, $SD = 2.24$) compared to those who answered with "not at all" ($M = 8.88$, $SD = 0.68$) and "more than half the days" ($M = 9.13$, $SD = 0.35$).

Conclusion

The primary focus of this study was to examine the association between depression and a variety of birth outcomes, and whether mental health treatment affected that relationship. From the screening tool measure that was used, demographic factors identified by literature to be associated with adverse birth outcomes were used in bivariate analyses. Demographic factors that were significant at the bivariate level where then used for inclusion in multivariable models to control for differences. Depression, mental health treatment, and key demographic factors

were used in multivariable models to examine their association with corresponding birth outcomes.

Our hypothesis regarding the relationship between depression, treatment use and birth outcomes was not supported. A possible explanation as to why depression was not associated with corresponding birth outcomes may have been due to the low rates reported. In addition, only few women reported any current mental health treatment.

Factors that were significantly associated with corresponding birth outcomes were education, race, and income. Race has been associated in literature with increased problematic birth outcomes, particularly among minority populations (Steer et al., 1992). Income and education, analyzed collectively as socioeconomic (SES) status, has been shown to be related to adverse birth outcomes. Literature states that the lower education levels the woman had and if they lived in a low income neighborhood, they were more likely to have a premature delivery, small for gestational age infant, and stillbirth (Luo, Wilkins, & Kramer, 2006). This brings up a key finding from this study that maybe problematic birth outcomes are more associated with race and SES status, than depression or treatment.

The heterogeneity of depression (that is different symptoms experienced) may explain the fact that some studies find an association with birth outcomes and others do not. A few previous studies have found that individual depression symptoms, such as stress and poor sleep, have been associated with increased risk of problematic birth outcomes (Chang, Pien, Duntley, & Macones, 2010; Lobel et. al., 2008). Therefore, since overall depression scores was not found to be related to birth outcomes here, supplemental analyses were conducted on individual depressive symptoms. It was observed that individuals had a greater likelihood of having a complication, premature delivery, or lower five minute APGAR score when they rated higher in terms of

symptom severity on the “lack of interest/pleasure” item and the “psychomotor agitation” item. Further research should explore whether certain symptom clusters related to biological causes of birth effects.

This study has several limitations. Although the primary outcome was to evaluate the association between depression and mental health treatment among particular birth outcomes, the study did not evaluate all possible birth outcomes. However, this study did focus on birth outcomes significantly associated in previous literature, but future studies should include a broader array of birth outcomes to assess for possible associations between depression and mental health treatment. Additionally, this study did not attempt to control for factors that have been shown to have influence on birth outcomes (e.g., preexisting health conditions, prescription drug use, genetics, diet, etc.). The PHQ-9 is a self-report measure which may be subject to under-reporting, even though it is a valid measure (Kocalevent, Hinz, & Brahler, 2013). In addition, the PHQ-9 was designed for brevity and some argue that several other symptoms not included in the DSM-IV could be added to increase its clinical value (e.g., loneliness or hopelessness) (Kroenke & Spitzer, 2002). Another limitation is the lack of screening tool administered at the Northwest FL clinic, therefore most analyses were only conducted using data from the North FL clinic. Due to the sampling procedure used, the results cannot be generalizable to all pregnant women, however it does give key insight to the women who receive care at the two corresponding clinic sites.

In summary, the findings from this study suggest that birth outcomes may be better explained by SES status and individual depression or depression related symptoms than mental health treatment. Future research must aim at analyzing depression and mental health treatment among large representative samples to really make an informed conclusion about the role of

treatment. If mental health treatment aids in the reduction of problematic birth outcomes among depressed women, then this reinstates the necessity of a standardized method of depression screening and the need for onsite clinical interventions to discuss treatment options.

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Table 1
Demographics, mental health treatment, and depression rates among pregnant women.

Domain	Variable	*N*	*M* (SD) or %
Demographics	Age	248	28.17 (5.46)
	Ethnicity		
	Hispanic/Latin	7	2.7%
	Non-Hispanic/Latin	251	97.3%
	Race[+]		
	White	300	52.3%
	Black/African American	220	38.3%
	Other	54	9.4%
	Marital Status		
	Married	159	59.6%
	Divorced	4	1.5%
	Never Married	57	21.3%
	Living w/ Partner	47	17.6%
	Income		
	$0-29,999	66	27.8%
	$30,000-69,000	72	30.4%
	$70,000 or higher	99	41.8%
	Employment Status		
	Full-time	143	59.8%
	Part-time	25	10.5%
	Unemployed	52	21.8%
	Other (Maternity leave/student)	19	7.9%
	Education[+]		
	Less than high school	83	14.9%
	High school graduate/GED	197	35.4%
	Some college	103	18.5%
	College graduate	118	21.2%
	Beyond college graduate	55	9.9%
MH Treatment	Current MH treatment	12	4.4%
	No Current MH treatment w/ PHQ-9 $\geq$ 10	15	88.2%
Currently Depressed	PHQ-9 $\geq$ 10[+]	69	11.9%

Note. MH = mental health; [+] represents data collected from both clinics, otherwise data only represents North FL clinic participants. There is some variation in *n* across variables due to missing data among both clinics and lack of screening tool at the Northwest FL clinic; valid percentages displayed.

Table 2

Results of logistic regressions block models examining the associations between PHQ-9 scores, any current mental health treatment, key predictor variables, and the following birth outcomes.

Complications

	Model 1[a]				Model 2[b]				Model 3[c]			
Variable	*B*	Wald	*OR*	*p*	*B*	Wald	*OR*	*p*	*B*	Wald	*OR*	*p*
PHQ-9 Sum	0.03	0.65	1.03	NS	0.04	0.89	1.04	NS	0.04	0.87	1.04	NS
Any current treatment												
No (reference)	-	-	-	-	-	-	-	-	-	-	-	-
Yes					-0.81	1.01	0.45	NS	-0.65	0.65	0.52	NS
Race												
White (reference)	-	-	-	-	-	-	-	-	-	-	-	-
Black/African American									0.32	1.04	1.37	NS
Other									0.99	4.77	2.69	.029

[a]Step 1: $X^2(1) = 0.65$, $p = .422$; Model: $X^2(1) = 0.65$, $p = .422$; [b]Step 2: $X^2(1) = 1.16$, $p = .281$; Model: $X^2(2) = 1.81$, $p = .405$; [c]Step 3: $X^2(2) = 4.95$, $p = .084$; Model: $X^2(4) = 6.75$, $p = .149$

Premature Delivery

	Model 1[a]				Model 2[b]			
Variable	*B*	Wald	*OR*	*p*	*B*	Wald	*OR*	*p*
PHQ-9 Sum	-0.03	0.11	0.98	NS	-0.02	0.08	0.98	NS
Any current treatment								
No (reference)	-	-	-	-	-	-	-	-
Yes					-18.54	0	0	NS

[a]Step 1: $X^2(1) = 0.11$, $p = .737$; Model: $X^2(1) = 0.17$, $p = .683$; [b]Step 2: $X^2(1) = 1.19$, $p = .275$; Model: $X^2(2) = 1.30$, $p = .522$

Note. NS = not significant. Results only pertain to North FL clinic due to lack of screening tool at Northwest FL clinic.

Table 3

Results of linear regressions block models examining the associations between PHQ-9 scores, any current mental health treatment, key predictor variables, and the following birth outcomes.

Birth Weight (g)

	Model 1[a]				Model 2[b]				Model 3[c]			
Variable	B	SE B	β	*p*	B	SE B	β	*p*	B	SE B	β	*p*
PHQ-9 Sum	15.12	11.12	0.09	NS	15.54	11.13	0.10	NS	16.92	11.22	0.10	NS
Any treatment												
No (reference)	-	-	-	-	-	-	-	-	-	-	-	-
Yes					-162.81	161.57	-0.07	NS	-188.03	160.60	-0.08	NS
Income												
High (reference)	-	-	-	-	-	-	-	-	-	-	-	-
Low									-161.404	89.61	-0.14	NS
Moderate									-13.36	81.32	-0.01	NS
Race												
White (reference)	-	-	-	-	-	-	-	-	-	-	-	-
Black/African American									-125.02	79.38	-0.12	NS
Other									-13.63	125.71	-0.01	NS

[a]Step 1: $R2 = .009$, $\Delta R^2 = .009$, $F(1, 215) = 1.85$, $p = .176$; [b]Step 2: $R^2 = .013$, $\Delta R^2 = .005$, $F(2, 214) = 1.43$, $p = .241$; [c]$R^2 = .055$, $\Delta R^2 = .042$, $F(6, 210) = 2.04$, $p = .061$

5 min APGAR

	Model 1[a]				Model 2[b]			
Variable	B	SE B	β	*p*	B	SE B	β	*p*
PHQ-9 Sum	-0.02	0.01	-0.08	NS	-0.02	0.01	-0.09	NS
Any treatment								
No (reference)	-	-	-	-	-	-	-	-
Yes					0.16	0.32	0.03	NS

[a]Step 1: $R^2 = .007$, $\Delta R^2 = .007$, $F(1,225) = 1.501$, $p = .222$; [b]Step 2: $R^2 = .007$, $\Delta R^2 = .001$, $F(2, 224) = 0.821$, $p = .441$

Note. B = unstandardized beta, SE = standard error, β = standardized beta. Results only pertain to North FL clinic due to lack of screening tool at Northwest FL clinic.

Appendix A

Non-reassuring fetal heart tracing (NRFHT)
Respiratory distress
Large for gestational age (LGA)
Fetal tachycardia
Cervical incompetence
Forceps
Breech birth
Preeclampsia
Cervical cerclage
Dystocia
Intrauterine Growth Restriction (IGR)
Nuchal cord
Eclampsia
Thrombocytopenia