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Predictors and patterns of mental health treatment dropout during pregnancy among low-income women

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Abstract

Objective—This study compared psychiatric treatment discontinuation rates among pregnant women using psychotropic medications, outpatient psychotherapy, or both before conception.

Methods—Using data from Pennsylvania Medicaid Fee-For-Service and Managed Care Organization claims and Medicaid enrollment, 3,030 women were identified who gave birth between 2007 and 2009, had 1 claim for psychiatric treatment during the 120 days prior to pregnancy, and were enrolled in Medicaid until they delivered. Kaplan-Meier and Cox regression analyses were used to estimate psychiatric treatment dropout rate during pregnancy and examine relationships between treatment dropout and age, race/ethnicity, and pre-pregnancy psychiatric diagnosis and treatment pattern.

Results—After the first trimester, the probability of discontinuing psychotropic medications was 83% vs. 37.8% for cessation of psychotherapy among combined treatment users. Two or more psychotherapy sessions in the four months prior to pregnancy were associated with decreased psychotherapy dropout during pregnancy. Psychotherapy during pregnancy was associated with prenatal psychotropic medication adherence.

Conclusions—To retain women in treatment during pregnancy, when discontinuation from care is common, innovative models of care should consider type of pre-pregnancy mental healthcare and individual characteristics.

Keywords

Prenatal mental health; maternal psychiatric disorders; psychiatric treatment dropout

INTRODUCTION

In 2013, 14.6% of adults received treatment for a mental health problem, with women using behavioral health services more frequently than men (1). Among women, the peak prevalence of psychiatric disorders occurs during the prime reproductive years. Depression (2) and anxiety (3, 4, 5) disorders are common in pregnancy and the postpartum period is a time of heightened risk for relapse to bipolar disorder (6). Several psychiatric disorders have been linked with a higher risk of preterm birth (7), low birth weight, intra-uterine growth restriction (8), gestational hypertension (9), pre-eclampsia (10) and diabetes (11), as well as poor maternal bonding in the postpartum (12). Continued mental healthcare is recommended during pregnancy for women with psychiatric disorders (13, 14). However, despite the growing literature suggesting the relative safety of antidepressants and some other psychotropic medications during pregnancy, many women (and their healthcare providers) have concerns about possible teratogenic effects to the fetus (15). This concern often leads to discontinuing medication treatment, creating a substantial risk for relapse (6,16), including suicidal ideation (15). The effect of discontinuing non-pharmacologic treatment on maternal wellness during pregnancy is unknown (15, 16, 17, 18).

These issues are particularly relevant for low-income urban minority women. Prevalence of both major and minor depression during pregnancy and the postpartum period are twice as high in low-income women compared to middle- and high-income women (20%–25% vs 9%–13%, respectively) (19, 20, 21). Similarly, racial and ethnic minority women are more likely to report depression during pregnancy than white women. Specifically, black and Latina women are five and two times more likely, respectively, to experience prenatal depression. This is associated with single marital status, fewer years of education, and higher rates of unemployment, self reported psychosocial stress, and domestic violence among the racial/ethnic minority women compared to non-Hispanic white women (22). Chaotic life circumstances such as unstable housing, financial stress, lack of reliable childcare, and unplanned pregnancies may increase the likelihood of treatment dropout among low-income, under-resourced women (23).

Maintaining psychiatric care during pregnancy can greatly enhance maternal well-being and the success of the pregnancy; however, few studies have comprehensively examined mental health utilization patterns during pregnancy among low-income women (17, 24, 25). To our knowledge, no studies have examined whether use of psychotropic medications, psychotherapy or a combination thereof, effects continuation of behavioral-health treatment during pregnancy. The joint report from the APA and the ACOG regarding treatment options for women with depression during pregnancy (14) highlights the importance of considering

both medications and non-pharmacologic psychiatric treatment options during pregnancy depending upon previous response to treatment, illness severity, and risk for relapse if treatment is discontinued.

In the present study, we examined whether the type and frequency of psychiatric treatment prior to conception effected pregnant women's continued use of treatment during pregnancy. Other variables including race/ethnicity and age were investigated to determine how these impacted treatment discontinuation. We address the limitations of prior studies by including a large, unselected sample of Medicaid-enrolled women, which increases generalization of the results, relying on claims (vs. self-report) to measure diagnoses and treatment use, and examining utilization of services across a range of psychiatric diagnoses.

METHODS

Data Source and Study Sample

The study used 2005–2009 Pennsylvania Medicaid Fee-For-Service (FFS), Managed Care Organization (MCO) claims data, and Medicaid enrollment data. Women who gave birth were first identified through the Diagnostic Related Group (DRG) codes including “0370 (cesarean-section with complication),” “0371 (cesarean-section without complication),” “0372 (vaginal-delivery with complicating diagnosis),” and “0373 (vaginal-delivery without complicating diagnosis).” Pregnancy duration was calculated by subtracting 280 days (for normal delivery) and 215 days (for preterm delivery) from the delivery date. Women who had given birth between January 1, 2007 and December 31, 2009, had one or more outpatient psychotherapy claims and/or psychiatric drug prescription claims pre-pregnancy, and were enrolled in Medicaid until their delivery date, were included in the study. The study sample included 3,030 women ages 17–40. While initially the age cutoff for inclusion in the analyses was set at 18, the limit was lowered to age 17 due to empirical findings. Pregnancy at age 17 was so common in the Medicaid claims data suggesting that not including this age group would limit the generalizability of our results.

Medicaid data were obtained through the Pennsylvania Department of Public Welfare and both (DPW) and University of Pennsylvania Institutional Review Board approved this study

Diagnosis, Treatment and Health Variables

Outpatient psychotherapy was identified by reviewing provider specialty codes and medical procedure codes of the Medicaid FFS and MCO behavioral health claims. Claims with provider specialty codes “psychiatric outpatient, practitioner or behavioral consultant” were identified. Then, those with medical procedure codes of “psychiatric interview/exam, individual psychotherapy outpatient,” “family psychotherapy with patient present,” “group psychotherapy,” “behavioral health counseling and therapy,” “therapeutic behavioral service,” “community-based wraparound service (therapeutic support staff)” were recoded as outpatient-psychotherapy. *Psychotropic medication-use* was defined as using one or more of the following classes of medications: antidepressants, anticonvulsants, antipsychotics, and benzodiazepines. Combined treatment was coded “Yes” if *both* outpatient psychotherapy and psychotropic pharmacy claims were found at any point during the four months prior to

pregnancy. A four-month window of time was chosen to determine which participants were in established psychiatric care prior to prenatal care and to avoid including women who may have completed their psychiatric treatment prior to becoming pregnant. It was also important that the time frame be longer than 59 days as that was the allowable gap for prescription refills without being considered to have dropped out of psychiatric medication use.

Dependent Variables—The dependent variables for treatment dropout included *outpatient-psychotherapy dropout during pregnancy* (Yes=1 vs. No=0) and *psychotropic medication dropout during pregnancy* (Yes=1 vs. No=0). Outpatient-psychotherapy dropout was recoded “yes” if there were no psychotherapy claims during pregnancy, or when the last claim occurred prior to 250 days gestation. The last claim date found in the pharmacy claims without a gap of more than 60 days in medication-use during pregnancy was treated as the last psychotropic medication-use date. Psychotropic medication dropout was recoded “yes” if there was no pharmacy claim found during pregnancy or the gap in medication-use was more than 60 days. The 60-day gap was empirically defined; 89.0% of all gaps between the pharmacy claims ranged from 1 to 59 days. Time to treatment dropout for each outcome was calculated based on the number of days between the estimated conception date and the last claim date found. We examined treatment dropout until 250 days gestation to account for medically indicated discontinuation of psychotropics and/or physical discomforts associated with late stage pregnancy, (i.e., edema, shortness of breath, fatigue, or pelvic pain) both of which may prevent clinic attendance in the third trimester.

Independent Variables—*Psychiatric diagnosis* and *chronic physical illness during the one year prior to pregnancy* were identified using the primary diagnosis variable based on the International Classification of Diseases (9th ed., ICD-9). The psychiatric diagnosis categories included: 1) bipolar disorder (296.00–296.06, 296.40–296.46, 296.50–296.56, 296.60–296.66, 296.80–296.82, and 296.89); 2) depression (296.20–296.26 and 296.30–296.36); 3) anxiety other mood disorders (296.xx, 300.xx and 311.xx except the codes classified as bipolar disorder and depression); 4) substance abuse disorder (292.xx, 303.xx, 304.xx, and 305.xx); 5) posttraumatic syndrome (PTSD, 309.81); 6) schizophrenia (295.xx); 7) adjustment disorder (309.xx); and 8) other mental illness (all other primary diagnoses between 290 and 319 found in the behavioral health claims).

Chronic physical illness was defined as having: 1) cardiac disease (398.xx, 411.xx–414.xx, 424.xx, 425.xx, 427.xx, 428.xx, and 446.xx); 2) diabetes (250.xx, 271.xx, and 277.xx); or 3) hypertension (401.xx–405.xx) in the year prior to pregnancy. Both psychiatric diagnosis and chronic physical illness were recoded as dichotomous variables (having the condition =1 vs. not having the condition =0). Individuals could have multiple diagnoses. Chronic physical illnesses were included in order to account for the potentially confounding nature on psychiatric treatment engagement. While those with chronic illnesses often have higher psychiatric treatment usage, physically debilitating chronic illnesses may impact attendance at psychiatric treatment visits or result in medication non compliance due to side effects.

Mean number of pre-pregnancy outpatient psychotherapy sessions were calculated. The *number of outpatient psychotherapy sessions during pregnancy* was categorized into none, one, two, and three or more sessions. Demographic variables included age categories of 20

years,, 21–30 years, and 31–40 years and race/ethnicity (African-American, Hispanic, White, and Other).

Data Analysis

First, descriptive analyses including chi-square statistics and general linear regression analysis were conducted to compare demographic characteristics, physical and mental health conditions and psychiatric treatment status pre- and during pregnancy by psychiatric treatment pattern pre-pregnancy. Second, Kaplan-Meier curves were calculated to compare unconditional probabilities of overall psychiatric treatment dropout observed by the last treatment dropout between outpatient psychotherapy and psychotropic medication-use during pregnancy, outpatient psychotherapy dropout during pregnancy, and medication dropout during pregnancy by psychiatric treatment pattern pre-pregnancy. Lastly, Cox regression analyses were used to identify significant factors associated with outpatient psychotherapy dropout and psychotropic medication dropout during pregnancy.

RESULTS

Patient Characteristics According to Pre-Pregnancy Treatment Condition

Table 1 provides a summary of the study sample ($n=3,030$) characteristics by pre-pregnancy treatment condition. Pre-pregnancy patterns for psychiatric treatment were as follows: 27.3% used both types of treatment, 38.4% had psychotherapy only, while 34.3% used only psychotropic medication. Women who received psychotherapy only were significantly younger, followed by those who used medication-only, and then by those using combined treatment ($p < .01$). The majority of women using medication only or combined treatment were white; women receiving psychotherapy only had a more evenly distributed racial/ethnic mix with 34.4% whites, 36.1% African-Americans and 26.9% Hispanics.

A greater proportion of women with a diagnosis of depression ($p < 0.01$) or bipolar disorder ($p < 0.01$) used combined treatment compared to either treatment alone. Women receiving only psychotherapy were more likely to have a diagnosis of adjustment disorder or other mental illness ($p < 0.01$). Over one-fifth of women using medication only had a substance abuse disorder diagnosis, while only 0.7% of combined treatment users and 1.8% of psychotherapy only users had this diagnosis ($p < 0.01$). About 12.6% of the group receiving both types of treatment and 11.9% of the group with medication-use only were diagnosed with a chronic physical illness, compared with 6.8% of the group receiving psychotherapy only ($p < 0.01$).

Patterns of Treatment and Treatment Dropout During Pregnancy

Figures 1, 2 and 3, respectively, show the Kaplan-Meier curves' probability of total treatment dropout, psychotherapy dropout only and medication dropout only. As shown in Figure 1, women using combined treatments pre-pregnancy remained in some type of treatment longer than women using either treatment alone. Women were more likely to stop using psychotropic medications than to stop attending psychotherapy. Figure 2 shows combined treatment users remained in psychotherapy longer than psychotherapy only users. Figure 3 shows the psychotropic medication dropout rates of the group receiving both

treatments and medication only users. As shown in Figure 3, medication dropout rates were similar between combined treatment users and medication-only users. However, psychotherapy dropout rates in the first trimester of pregnancy were very different; 37.8% for combined treatment users and 55.3% for the psychotherapy only users. For the entire length of pregnancy, the probability of staying in psychotherapy was higher for those with combined treatment use prior to pregnancy.

Tables 2 and 3 show the Cox regression results for dropping out of outpatient psychotherapy and medication-use, respectively. As shown in Table 2, three or more psychotherapy sessions compared to only one pre-pregnancy was associated with significantly lower risk of psychotherapy dropout during pregnancy (OR = 0.7 for two psychotherapy sessions and OR = 0.5 for three or more psychotherapy sessions both at $P < 0.01$). Being Hispanic (OR = 0.7, $p < 0.01$), having bipolar disorder (OR = 0.8, $p < 0.01$) and using psychotropic medication during pregnancy (OR = 0.6, $p < 0.01$) were also associated with reduced risk of psychotherapy dropout. However, having a diagnosis of substance abuse (OR = 1.6, $p < 0.05$) and using antidepressants pre-pregnancy were associated with higher risk of psychotherapy dropout. As shown in Table 3, having one psychotherapy session compared to medication-use only (OR = 1.2, $p < 0.05$), and being African-American (OR = 1.2, $p < 0.05$), Hispanic (OR = 1.3, $p < 0.01$), and younger (OR = 1.4, $p < 0.01$ for age 20 or younger and OR = 1.2, $p < 0.05$ for ages 21–30 years) were each associated with higher risk of medication dropout. On the other hand, having psychotherapy during pregnancy (OR = 0.7, $p < 0.01$) and using anticonvulsants (OR = 0.8, $p = 0.05$) and benzodiazepines (OR = 0.7, $p < 0.01$) pre-pregnancy were associated with lower risk of dropping medication-use.

DISCUSSION

The present study examined the differential impact on treatment dropout of the type of treatment being used, psychiatric diagnosis, and class of medication prescribed. We also examined the effects of race/ethnicity and age on psychiatric treatment dropout, which have been shown to affect treatment engagement (26, 27, 28) but have not been examined among pregnant women. Our study found a high rate of treatment discontinuation during pregnancy while highlighting the benefit of engaging reproductive aged women in psychotherapy pre-conception. The beneficial effect of pre-conception psychotherapy engagement on treatment maintenance during pregnancy was found regardless of whether psychotropic medication was used. Studies of non-pregnant women find that using both medications and therapy predicts treatment adherence and is associated with better outcomes (29, 30, 31).

That women who receive psychotherapy pre-pregnancy were more likely to remain engaged in behavioral healthcare, even if psychotropic medications were discontinued during pregnancy, has important clinical ramifications. While psychological interventions may reduce the likelihood of relapse, continued monitoring by a behavioral health professional allows for rapid intervention in cases of decompensation. The women in this study not only discontinued antidepressants and benzodiazepines, but also antipsychotics and anticonvulsants, increasing their risk to relapse of psychosis which can seriously impact judgment and the likelihood of remaining in prenatal and behavioral healthcare.

We used the number of psychotherapy sessions pre-pregnancy as a proxy for pre-pregnancy engagement in behavioral healthcare and expected that greater pre-pregnancy engagement would predict greater engagement throughout gestation. In fact, women with two, and three or more, pre-pregnancy psychotherapy sessions were 28% and 53%, respectively, less likely than those with only one psychotherapy session to dropout of psychotherapy during pregnancy. Until now there has been no evidence-base to recommend how much pre-pregnancy therapeutic engagement is necessary to improve patient retention during pregnancy. This study suggests that a higher number of pre-pregnancy psychotherapy sessions significantly influences psychotherapy adherence during pregnancy.

Some may argue that the higher level of engagement may be driven by those who are psychiatrically sicker, thereby explaining the increased number of sessions and subsequent medication adherence. Our finding that those who used psychotherapy pre-pregnancy were less likely to discontinue medications seems to confirm this. In our sample, having only one pre-pregnancy psychotherapy session increased the likelihood of medication dropout while two or more pre-pregnancy psychotherapy sessions was not associated with medication dropout. However, severity of illness does not necessarily predict engagement in care. For example, in a different published study examining treatment dropout rates among individuals with schizophrenia, severity of illness had no effect on dropout rates. In that study, the authors found that 42% of individuals with schizophrenia discontinued medication compared to 13% who discontinued psychosocial treatment, indicating that psychotherapy confers a benefit towards patient retention which is not explained by severity of illness (32).

More sessions may result in a good rapport with the provider and knowledge of the importance of treatment maintenance during pregnancy leading to medication adherence regardless of symptom severity.

Impact of psychiatric diagnosis on treatment pattern

Among those with a with a substance abuse diagnosis, it was striking to note the relative few (1.4%) who used psychotherapy-only pre-pregnancy and the high dropout from psychotherapy during pregnancy. In contrast, dropout from medication-only in this group was quite low which is noteworthy considering that we did not include opiates (e.g., methadone, buprenorphine) as one of the classes of psychotropic medications.

Women diagnosed with bipolar disorder were more likely to remain in psychotherapy. Given the severity of bipolar disorder, and the relapse-provoking nature of sleep disruptions and hormonal shifts common to pregnancy, women who may have had well-controlled bipolar symptoms prior to pregnancy may choose to stay in care during pregnancy to prevent a worsening of symptoms.

Hispanic women are likely to remain in psychotherapy, which may indicate their unwillingness to take medications, coupled with the recognition of their need for professional psychiatric intervention (33). Minority women are less likely to find psychotropic medications acceptable compared to white women (34, 35) and our study confirmed that white women are more likely to continue medication-use than black or Hispanic women.

While pre-pregnancy psychotherapy may protect against complete treatment-dropout during pregnancy, our sample showed a high rate of psychotherapy-dropout in early pregnancy, which cannot be overlooked. High rates of psychotherapy treatment dropout in disadvantaged populations are common. In a sample of non-pregnant low-income minority women with depression, only 67% and 35% completed the recommended full trial of medication or CBT, respectively, even when other barriers such as transportation and childcare were eliminated (36). Even without the added burden of pregnancy, low-income and minority women may drop out of treatment at a fairly high rate.

A higher proportion of pregnant women with a chronic physical illness used both treatments (12.6%) or medication-only (11.9%) compared to those who used psychotherapy only (6.8%). While this difference did not significantly contribute to treatment drop-out of either psychotherapy or medication use, it suggests that perhaps those with chronic illnesses may experience other barriers to engaging in psychotherapy prior to pregnancy in the absence of psychiatric medication prescription. This signifies a need for more collaborative care between psychiatric and medical care providers of pre-conception women.

A number of study limitations should be considered. First, Medicaid claims data does not provide information on gestational age at delivery. The method we used to calculate the estimated conception date could have resulted in some error in designating whether the treatment dropout occurred before or during the pregnancy.

Second, insurance claims data are inherently unable to provide detailed information about illness severity and the treatment being delivered. There are significant gradations in mental health disorder severity; not having this information makes it difficult to know whether discontinuing medication is problematic. Similarly, it is impossible to confirm medication compliance based on prescription and refill data. While almost 90% of medication refills were within 60 days, there were some women who refilled their medication after 60 days whose inclusion may have changed the results for medication dropout.

Third, given that 50% of women discontinued medication by 6 weeks gestation, we were not able to observe the differential impact of individual psychiatric diagnoses on medication-use during pregnancy.

Fourth, postpartum reuptake of medications that may have been medically discontinued due to a contraindication in pregnancy was not examined. In these cases, medication discontinuation was likely not a true treatment-dropout but rather a temporary cessation for the sake of the health of the pregnancy. Similarly, we cannot determine how psychosocial barriers contributed to treatment-dropout. These could include difficulties or costs associated with transportation, childcare, mobility challenges given the discomforts of pregnancy, or simply the burden of many medical appointments. Worsening symptom severity or non-response to treatment could be responsible for treatment-dropout as could fears of teratogenic risk to the fetus, or child protective service involvement if a woman is actively reporting psychiatric symptoms during pregnancy. Overall, we are unable to comment on specific reasons why women dropped out of treatment during pregnancy.

Despite the limitations, there are important implications related to these findings. Unintended pregnancy is very common in the United States (37) and even more so among women with prior psychiatric concerns (38). Without knowledge about safe options for continuing psychiatric care during pregnancy it is likely that women will drop out of treatment. Our findings suggest that pre-conception use of sustained psychotherapy alone or with medication is critical to continued engagement with behavioral healthcare throughout pregnancy among low-income, urban-dwelling women. Clinicians must consider challenges to patient retention, including the lack of awareness of the safety of many psychotropic medications in pregnancy, fears of teratogenic risk to the fetus with continued medication use during pregnancy, or concerns about breastfeeding while taking psychotropic medications postpartum. Counseling all reproductive age female patients on how to proceed with treatment in case of an unintended pregnancy, and discussing the risk-benefit analysis of taking a psychiatric medication vs. suffering with untreated mental illness during pregnancy may be a useful first step towards keeping pregnant patients engaged in care. As there may be confusion even amongst medical providers as to the appropriate course of psychiatric treatment during pregnancy, more consensus guidelines and systematic actions are warranted (e.g., 39). Focusing these educational efforts towards women who are more likely to drop out (i.e., ethnic minorities, those with substance abuse disorders, and those using antidepressants) is also recommended. It is important to cultivate a good rapport especially with these patients. Innovative models of care such as co-located prenatal care-mental health programs are needed to reduce psychosocial barriers to care. Future studies should examine the effectiveness of such programs in retaining women who might otherwise dropout of psychiatric care. Whether such engagement with psychiatric services during pregnancy leads to improved health outcomes and costs savings is an area of ongoing investigation and public health concern.

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Significance

Unintended pregnancy is very common in the United States and even more so among women with prior psychiatric concerns. Without knowledge about safe options for continuing psychiatric care during pregnancy it is likely that women will drop out of treatment. Pre-conception use of sustained psychotherapy alone or with medication is critical to continued engagement with behavioral healthcare throughout pregnancy among low-income, urban-dwelling women. Clinicians must consider challenges to patient retention, including the lack of awareness of the safety of many psychotropic medications in pregnancy. Counseling all reproductive age female patients on how to proceed with treatment in case of an unintended pregnancy may be a useful first step towards keeping pregnant patients engaged in care.

Figure 1.

Kaplan-Meier curve of psychiatric treatment dropout during pregnancy by pre-pregnancy treatment condition (Number of individuals included in the analysis = 3,030 Women)

Figure 1 illustrates dropout from all three psychiatric treatment conditions across pregnancy observed up to 250 days based upon the treatment condition used prior to conception. As individual could switch from one type of treatment to another during the course of pregnancy, this figure illustrates the timing of last utilization of any type of psychiatric treatment. The last pregnancy month was not observed considering that clinicians might not prescribe certain psychotropic medications and pregnant women might have difficulty in going to the clinic for psychotherapy during the last month.

Figure 2.

Kaplan-Meier curve of psychotherapy use dropout during pregnancy by pre-pregnancy treatment condition (Number of individuals included in the analysis = 1,993 Women)

Figure 2 illustrates the timing of last utilization of psychotherapy during pregnancy observed up to 250 days among those women who were utilizing this method of treatment alone or in combination with psychotropic medication prior to pregnancy. The last pregnancy month was not observed considering that clinicians might not prescribe certain psychotropic medications and pregnant women might have difficulty in going to the clinic for psychotherapy during the last month.

Figure 3.

Kaplan-Meier curve of psychotropic medication-use dropout during pregnancy by pre-pregnancy treatment condition (Number of individuals included in the analysis = 1,865 Women)

Figure 3 illustrates the timing of last utilization of psychotropic medication (based upon pharmacy records) during pregnancy observed up to 250 days among those women who were utilizing this method of treatment alone or in combination with psychotherapy prior to pregnancy. The last pregnancy month was not observed considering that clinicians might not prescribe certain psychotropic medications and pregnant women might have difficulty in going to the clinic for psychotherapy during the last month.

Table 1

Demographic characteristics and psychiatric diagnosis and treatment status analysis of study sample (Sample size =3,030 women)

Variable	Both Outpatient Psychotherapy and Medication -use (n=828)	Medication-Use Only (n=1,037)	Outpatient Psychotherapy Only (n=1,165)	P
	%			
Age				<.001
20 years old or younger (n=841)	20.4	21.5	38.5	
21 – 30 years old (n=1,627)	55.9	59.4	47.0	
31 – 40 years old (n=562)	23.7	19.1	14.4	
Race/ethnicity				<.001
African American (n=828)	24.2	20.2	36.0	
Hispanic (n=650)	28.4	9.7	27.0	
White (n=1,487)	45.3	68.6	34.4	
Other (n=65)	2.2	1.5	2.7	
Psychiatric diagnosis 1 year prior to pregnancy				
Depression (Yes =1, n=903)	38.3	25.8	27.3	<.001
Bipolar (Yes =1, n=452)	18.2	14.3	13.1	<.01
Substance abuse (Yes =1, n=238)	0.7	20.4	1.8	NS
PTSD (Yes =1, n=114)	4.8	2.6	4.0	NS
Schizophrenia (Yes =1, n=70)	2.8	3.2	1.2	<.05
Anxiety and other mood disorder (Yes =1, n=824)	27.8	23.8	29.8	NS
Adjustment disorder (Yes =1, n=246)	5.4	4.3	13.4	<.001
Other mental illness (Yes =1, n=283)	7.5	5.7	13.9	<.001
Psychiatric medication-use during 4 months prior to pregnancy				
Anticonvulsants (Yes =1, n=209)	10.0	12.2	NA	<.001
Antidepressants (Yes =1, n=1,556)	86.2	81.2	NA	<.001
Benzodiazepines (Yes =1, n=734)	40.1	38.8	NA	<.001
Antipsychotics (Yes =1, n=93)	4.8	5.1	NA	<.001
Psychiatric medication-use during pregnancy				
Anticonvulsants (Yes =1, n=148)	6.9	8.8	NA	<.001
Antidepressants (Yes =1, n=1,158)	64.5	60.2	NA	<.001
Benzodiazepines (Yes =1, n=589)	31.0	32.0	NA	<.001
Antipsychotics (Yes =1, n=76)	4.1	4.1	NA	<.001
Mean number of outpatient psychotherapy sessions during 4 months prior to pregnancy				
Mean (SD)	2.03 (0.87)	NA	1.86 (0.86)	NS
Number of psychotherapy sessions during 4 months prior to pregnancy				NS
0 (n=1,037)	0.0	100.0	0.0	
1 (n=824)	36.5	0.0	44.8	
2 (n=491)	24.5	0.0	24.7	
3 or more (n=678)	39.0	0.0	30.5	

Variable	Both Outpatient Psychotherapy and Medication -use (n=828)	Medication-Use Only (n=1,037)	Outpatient Psychotherapy Only (n=1,165)	P
Number of psychotherapy sessions during pregnancy				<.001
0 (n=1,384)	30.7	62.9	41.0	
1 (n=406)	14.4	11.3	14.6	
2 (n=249)	9.2	6.9	8.8	
3 or more (n=991)	45.8	19.0	35.6	
Having physical chronic illness during 1 year prior to pregnancy (Yes=1, n = 306)	12.6	11.9	6.8	<.001

Note. Chi-square analysis and general linear regression analysis were used to examine significant difference by treatment group. NA: Not applicable. NS: Not significant

Table 2

Cox regression analysis on psychotherapy dropout during pregnancy (Number of individual included in the analysis = 1,993)

Parameter for outpatient psychotherapy dropout model	Pr > ChiSq	Hazard Ratio	95% Hazard Ratio	Confidence Limits
Number of psychotherapy sessions 4 months prior to pregnancy (Reference group=1 session)				
3 or more sessions	<.001	0.466	0.412	0.526
2 sessions	<.001	0.724	0.639	0.819
Medication-use during pregnancy (Yes = 1)	<.001	0.559	0.469	0.666
Race (Reference group = White)				
African American	0.950	0.996	0.884	1.123
Hispanic	<.001	0.717	0.627	0.819
Other	0.239	0.815	0.580	1.146
Age (Reference group = 31–40 years old)				
20 years old or younger	0.021	1.202	1.029	1.404
21–30 years old	0.055	1.148	0.997	1.322
Psychiatric diagnosis 1 year prior to pregnancy				
Bipolar	<.001	0.755	0.651	0.876
Depression	0.267	0.936	0.833	1.052
Schizophrenia	0.452	0.862	0.585	1.269
Substance Abuse	0.014	1.648	1.107	2.453
Previous chronic illness history (Yes = 1)	0.360	0.920	0.769	1.100
Psychotropic medication-use 4 months prior to pregnancy				
Antidepressants	0.041	1.172	1.007	1.364
Anticonvulsants	0.674	0.944	0.722	1.234
Benzodiazepine	0.650	0.963	0.816	1.135
Antipsychotic	0.914	1.021	0.705	1.477

Note. The analysis included groups of individuals with both psychotherapy and medication-use and individuals with psychotherapy only during 4 months prior to their pregnancy. Overall model: $\chi^2 = 352.45$, $df = 17$, $p < .001$.

Table 3

Cox regression analysis on medication-use dropout during pregnancy (Number of individuals included in the analysis =1,865)

Parameter for psychiatric medication-use dropout model	Pr > ChiSq	Hazard Ratio	95% Hazard Ratio Confidence Limits	
Number of psychotherapy sessions 4 months prior to pregnancy (Reference group= Medication-use only)				
3 or more sessions	0.796	1.020	0.877	1.187
2 sessions	0.220	1.108	0.941	1.306
1 session	0.031	1.163	1.014	1.334
Psychotherapy visit during pregnancy	<.001	0.728	0.653	0.811
Race (Reference group = White)				
African American	0.002	1.222	1.080	1.382
Hispanic	<.001	1.338	1.166	1.535
Other	0.545	1.118	0.778	1.606
Age (Reference group = 31–40 years old)				
20 years old or younger	<.001	1.373	1.174	1.605
21–30 years old	0.002	1.225	1.078	1.393
Psychiatric diagnosis 1 year prior to pregnancy				
Bipolar	0.602	1.039	0.900	1.198
Depression	0.319	1.059	0.946	1.187
Schizophrenia	0.066	0.750	0.552	1.019
Substance Abuse	0.555	0.950	0.800	1.127
Previous chronic illness history (Yes = 1)	0.841	0.985	0.846	1.146
Psychotropic medication-use 4 months prior to pregnancy				
Antidepressants	0.091	0.881	0.761	1.021
Anticonvulsants	0.051	0.848	0.719	1.001
Benzodiazepine	<.001	0.688	0.616	0.769
Antipsychotic	0.967	1.005	0.799	1.264

Note. The analysis included groups of individuals with both psychotherapy and medication-use and individuals with medication-use only during 4 months prior to their pregnancy. Overall model: $\chi^2 = 158.81$, $df = 18$, $p < .001$.