

Psychiatric Disorders and Treatment in Low-Income Pregnant Women

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Abstract

Aims: This study estimated the prevalence of twenty-two 12-month and lifetime psychiatric disorders in a sample of 744 low-income pregnant women and the frequency that women with psychiatric disorders received treatment.

Method: To identify psychiatric disorders, the Diagnostic Interview Schedule (DIS) was administered to Medicaid or Medicaid-eligible pregnant women enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). The sample was stratified by the rural or urban location of the WIC sites in southeastern Missouri and the city of St. Louis. Eligible women were enrolled at each site until their numbers were proportional to the racial distribution of African American and Caucasian pregnant women served there.

Results: The 12-month prevalence of one or more psychiatric disorders was 30.9%. Most common were affective disorders (13.6%), particularly major depressive disorder (8.2%) and bipolar I disorder (5.2%). Only 24.3% of those with a psychiatric disorder reported that they received treatment in the past year. Lifetime prevalence of at least one disorder was 45.6%, with affective disorders being the most frequent (23.5%). Caucasian women were more likely than African Americans to have at least one 12-month disorder, with the difference largely accounted for by nicotine dependence. Higher prevalence of lifetime disorders was also found in Caucasian women, particularly affective disorders and substance use disorders. There were no differences in the prevalence of 12-month or lifetime psychiatric disorders by the urban or rural residence of subjects.

Conclusions: With nearly one third of pregnant women meeting criteria for a 12-month psychiatric disorder and only one fourth receiving any type of mental health treatment, comprehensive psychiatric screening during pregnancy is needed along with appropriate treatment.

Introduction

EMPIRICAL EVIDENCE links psychiatric symptoms and diagnoses during pregnancy with poor reproductive outcomes and compromised child development. Associated outcomes include pregnancy loss,¹ preterm delivery, low birth weight, and small-for-gestational age (SGA) births,^{2,3,4,5} as well as sudden infant death syndrome.⁶ Poor birth and developmental outcomes have also been associated with depression,⁷ anxiety-related disorders,^{8,9} substance use,^{10,11} posttraumatic stress disorder (PTSD),^{12,13} and schizophre-

nia.¹⁴ Not only does prenatal psychiatric illness compromise the health of mothers and infants, treatment of preterm and SGA infants is a major healthcare expenditure in this country. To date, there is little research that describes the overall prevalence of DSM-IV (*Diagnostic and Statistical Manual of Mental Disorders-IV*) psychiatric disorders in pregnancy and their treatment.

Well-known national epidemiologic surveys, such as the Epidemiologic Catchment Area (ECA) study and National Comorbidity Study (NCS), estimate that 20%–30% of women of childbearing age meet criteria for at least one psychiatric

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disorder based on symptoms in the previous 12 months.^{15,16} Early studies of pregnant women tended to focus on psychological distress or symptoms rather than diagnoses, used small samples, and rarely investigated more than one disorder in the same sample.^{17,18} Building on these early studies, later research began to focus on the prevalence of multiple DSM-IV psychiatric diagnoses in pregnancy, including the study by Andersson and colleagues¹⁹ using the PRIME-MD questionnaire to screen for 13 DSM-IV disorders in 1,795 Swedish women seen at two obstetric clinics during their second trimester. They found that 14.1% of the women had at least 1 of 13 diagnoses, with the most common categories being affective disorders (11.6%) and anxiety disorders (6.6%). A recent study of psychiatric disorders in 1,000 pregnant teenagers in Brazil using the Composite International Diagnostic Interview (CIDI) found that 32.5% had at least 1 ICD-10 psychiatric disorder.²⁰ The most common disorder was depression (12.9%) followed by PTSD (10%) and tobacco dependence (1.03%). A nationally representative sample from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions was used by Vesga-Lopez and colleagues²¹ to compare women who had been pregnant in the past year with those who had not. Using the National Institute on Alcohol Abuse and Alcoholism's (NIAAA's) Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM-IV version—one fourth (25.3%) of the pregnant women had at least one 12-month psychiatric disorder, with the most common being substance abuse (14.6%) and mood (13.3%) and anxiety disorders (13.0%). Pregnant women were not at an increased risk of having a new or recurrent psychiatric disorder, although they were significantly less likely to report substance use disorders.

The prevalence of psychiatric disorders tends to be higher in economically disadvantaged populations.^{22,23,24} This trend is found in early studies of pregnant women. Using the PRIME-MD and modified CAGE questionnaires, Kelly, Zatzick, and Anders²⁵ found that 38% of 186 multi-ethnic women receiving prenatal care at a university-based obstetric clinic had at least one of eight categories of psychiatric disorders based on symptoms in the past six months. Of the women with psychiatric diagnoses, only 23% had been identified by their prenatal care provider. Consistent with findings in the Andersson study, the most common diagnostic category was depression (21%). In a similar sample of 154 pregnant women, Kim and colleagues²⁶ found a prevalence of 31% using both the PRIME-MD and Mood Disorder Questionnaire when including substance abuse disorders and 29% when not including substance disorders.

Disparities in the prevalence of psychiatric disorders by race have been investigated in the general population, but few have focused on pregnant women. Findings from national probability studies demonstrate little overall variation in the current prevalence of psychiatric disorders by race.^{15,27} However, identification of disparities in psychiatric disorders among pregnant women has important policy implications in the allocation of mental health resources for these populations. Even less is known about the prevalence of prenatal psychiatric disorders in rural communities. Infant mortality and morbidity rates in rural areas are unacceptably high in many communities.²⁸ Furthermore, access to mental health treatment is limited in many rural areas.

This study is a community-based investigation of 744 low-income pregnant African American and Caucasian women, representative of Special Supplement Nutrition Program for Women, Infants and Children (WIC) recipients from one inner city and five rural counties in the state of Missouri. It provides estimates of the 12-month and lifetime prevalence of 22 different DSM-IV psychiatric disorders, as well as their treatment rates.

Materials and Methods

A sample of 744 low-income Medicaid and Medicaid-eligible pregnant women receiving WIC services was interviewed between February 25, 2000 and August 16, 2001. The sample was stratified by the rural or urban location of the WIC sites, which included sites in five rural counties in southeastern Missouri and six randomly selected sites in the city of St. Louis. The eleven sites were representative of WIC programs in these two regions. Eligible women were enrolled at each site until their numbers were proportional to the racial distribution of African American and Caucasian pregnant women served there. Women of other races were not included because low numbers precluded calculating reliable prevalence estimates.

Women were eligible for participation if they met the following inclusion criteria: (1) pregnant, (2) 13–45 years old, (3) eligible for Medicaid, (4) receiving WIC services, and (5) able to speak English. As the time data were collected in this study, pregnant women were eligible for Medicaid in Missouri at 185% of the federal poverty level. Very few African American and Caucasian women were ineligible because of their inability to speak English. Some Caucasian women receiving urban WIC services could have been non-English-speaking refugees from Eastern Europe (ie, Bosnia). An estimated 2.5% of foreign-born residents at that time were from Europe.²⁹ However, the sample in this study was very young, and there is evidence that younger immigrants are more likely to have better proficiency in English than older generations.³⁰ Exclusion criteria for the study included cognitive impairment (defined as 12 or more errors on the dementia module of the Diagnostic Interview Schedule [DIS]). Only one subject was dropped from the study because of cognitive impairment. Of 878 eligible women asked to participate in the study, 132 (15.0%) either refused or were unavailable for the interview, which yielded 85% participation. Although there were no significant differences between responders and nonresponders by race, nonresponders tended to be older (t -test = -2.03 , df (degrees of freedom) = 972 , $p < .05$). Nonresponders were considerably more likely to reside in urban areas ($\chi^2 = 86.0$, $p < .001$), which was consistent with interviewer comments that the financial incentive to participate was less motivating for urban respondents than for rural ones.

As shown in Table 1, the sample of 744 respondents in this study included 428 African Americans (57.5%) and 316 Caucasians (42.5%). Fifty-nine percent ($n = 439$) resided in rural southeast Missouri, and 41.0% ($n = 305$) lived in the city of St. Louis. One in five was married, with the majority never having been married. Their mean age was 22.2 years, with a range from 13 to 43 years. Twenty-three percent of mothers were under 19 years of age. Two out of five participants had not finished high school. Over one half had at least one previous live birth. While the vast majority received prenatal care

TABLE 1. SOCIODEMOGRAPHIC AND PREGNANCY-RELATED CHARACTERISTICS OF SAMPLE ($n = 744$)

Characteristic	Number ^a	Percent
Race		
African American	428	57.5
Caucasian	316	42.5
Residence		
Rural	439	59.0
Urban	305	41.0
Education		
Less than high school	311	41.8
High school graduate	360	48.4
Vocational or some college	58	7.8
Bachelor's degree	8	1.1
Graduate degree	7	0.9
Marital status		
Never married	523	70.3
Married	160	21.5
Separated or divorced	60	8.1
Widowed	1	0.1
Trimester began prenatal care^b		
First	580	80.8
Second	110	15.3
Third	9	1.3
No prenatal care	19	2.6
Previous live births		
Yes	428	57.8
No	313	42.2
History of serious medical condition(s)		
None	508	68.3
One	192	25.8
Two	43	5.9
Months of full-time work in last 12 Months^c		
Mean \pm standard deviation	4.5 \pm 4.5	
Median	3.0	
Age in years		
Mean \pm standard deviation	22.2 \pm 5.2	
Median	21.0	

^aMissing data accounts for column numbers that do not add up to the total sample size.

^bTrimester of prenatal care is based on self-report.

^cFull-time work is 35 hours or more per week.

in their first trimester, 3.9% received care in their third trimester or not at all. More than one fourth of the women had at least one serious medical problem in their lifetime.

Data collection protocol

Eligible participants were approached about enrollment in the study when they received services at their local WIC program. After a complete description of the study, written informed consent was obtained from those who agreed to participate. Approved by the institutional review boards at Saint Louis University and the Missouri Department of Health and Senior Services, the study followed the ethical standards of the Declaration of Helsinki.³¹ Pregnant minors gave consent for participation based on Missouri statutes that allow pregnant minors to consent to medical care.³²

Subjects were interviewed in their homes or at a mutually convenient location. Interviews lasted approximately two

hours, depending on the extent of psychiatric impairment. One in five mothers (21.8%; $n = 162$) were interviewed in their first trimester of pregnancy, 40.7% ($n = 303$) in their second trimester, and the remaining 37.5% ($n = 279$) in their last trimester.

Interviewers lived in either the urban or rural areas targeted, and they received week-long training by a certified DIS trainer in the implementation of study protocol and instruments. In most cases interviewers and subjects were matched by race. All interviews were taped, and initial interviewers were reviewed to insure consistency and quality. Tapes were then sampled throughout the remaining data collection period to monitor quality. Not only did a field supervisor work directly with interviewers, but an investigator also met regularly for debriefing and targeted retraining. Interviewers were contacted directly by their field supervisors to clarify any problems encountered with their interview data (see Flick 2006 for additional discussion³³).

Instruments

The DIS-IV was used to measure the occurrence of 12-month and lifetime psychiatric disorders. This structured, lay-administered interview assesses full diagnostic criteria for psychiatric disorders based on the DSM-IV. Assessment includes symptom counts, onset, recency and duration of symptoms, periods of remission, disruption in work or social relationships, and receipt of treatment.^{34,35} Good to excellent reliability for most diagnoses has been reported for the DIS.³⁶ Validity has been demonstrated through comparisons of the DIS with other diagnostic structured interviews³⁷ and clinical psychiatric evaluations.³⁸ To date, the DIS has not been specifically validated for pregnant women. DIS criteria used to measure the receipt of treatment in the last 12 months was defined broadly as speaking with a health professional about symptoms related to their psychiatric disorder(s). These professionals could include nurses, physicians, social workers, psychologists, counselors, clergy, dentists, chiropractors, or healers. Standardized sociodemographic questions from the DIS were used, as well as pregnancy-related questions adapted from the Pregnancy Risk Assessment Monitoring Systems.³⁹ This instrument is used by the Centers for Disease Control and Prevention (CDC) and state health departments to collect data before, during, and after pregnancy.

Data analyses

Data entry, cleaning, and analyses were conducted using SAS-PC (Versions 8.0 and 9.0) and SPSS (Version 13.0). Responses about psychiatric symptoms were converted into diagnoses using the DIS-IV scoring program. The 12-month and lifetime prevalence rates of psychiatric disorders were calculated along with 95% confidence intervals. Prevalence estimates were obtained for rural/urban and African American/Caucasian subgroups, but the prevalence rates of various psychiatric disorders were too low to achieve stability within each race and rural/urban combination.

Results

The prevalence of pregnant women with one or more psychiatric disorders during the previous 12 months was 30.9% (Table 2). When nicotine dependence was excluded, the

TABLE 2. PREVALENCE OF 12-MONTH AND LIFETIME PSYCHIATRIC DISORDERS IN 744 WIC-ENROLLED PREGNANT WOMEN

Psychiatric disorder	No. ^a	12-month		No.	Lifetime	
		%	95% CI		%	95% CI
Affective disorders						
Major depressive disorder	61	8.2	6.2–19.2	120	16.1	13.5–18.8
Dysthymia	1	0.1	0.0–0.4	2	0.3	0.0–0.6
Bipolar I	39	5.2	3.6–6.8	52	7.0	5.2–8.8
Bipolar II	0	0.0	0.0–0.0	1	0.1	0.0–0.4
<i>Any affective disorder</i>	101	13.6	11.1–16.0	175	23.5	20.5–26.6
Anxiety disorders						
Generalized anxiety disorders	27	3.6	2.3–5.0	31	4.2	2.7–5.6
Agoraphobia	0	0.0	0.0–0.0	2	0.3	0.0–0.6
Panic disorder	7	0.9	0.2–1.6	9	1.2	0.4–2.0
Specific phobia	18	2.4	1.3–3.5	35	4.7	3.2–6.2
Social phobia	20	2.7	1.5–3.9	32	4.3	2.8–5.8
Obsessive compulsive disorder	6	0.8	0.2–1.4	14	1.9	0.9–2.9
Posttraumatic stress disorder	57	7.7	5.8–9.6	107	14.4	11.9–16.9
<i>Any anxiety disorder</i>	97	13.0	10.6–15.5	164	22.0	19.1–25.0
Psychotic disorders						
Schizophrenia	3	0.4	0.0–0.9	8	1.1	0.3–1.8
Schizophreniform	0	0.0	0.0–0.0	8	1.1	0.3–1.8
Schizoaffective disorder	0	0.0	0.0–0.0	0	0.0	0.0–0.0
<i>Any psychotic disorder</i>	3	0.4	0.0–0.9	14	1.9	0.9–2.9
Behavior disorders						
Oppositional disorder ^b	36	4.8	3.3–6.4	26	3.5	2.2–4.8
Conduct disorder	9	1.2	0.4–2.0	20	2.7	1.5–3.9
Antisocial personality disorder	0	0.0	0.0–0.0	6	0.8	0.2–1.4
<i>Any behavioral disorder</i>	39	5.2	3.6–6.8	52	7.0	5.2–8.8
Eating disorder						
Anorexia	1	0.1	0.0–0.4	6	0.8	0.2–1.4
Bulimia	1	0.1	0.0–0.4	1	0.1	0.0–0.4
<i>Any eating disorder</i>	2	0.3	0.0–0.6	7	0.9	0.2–1.6
<i>Any attention deficit hyperactivity disorder</i>	15	2.0	1.0–3.0	30	4.0	2.5–5.4
Substance use disorders						
Nicotine dependence	62	8.3	6.3–10.3	101	13.6	11.1–16.0
Alcohol Abuse or dependence	8	1.1	0.3–1.8	63	8.5	6.5–10.5
Drug abuse or dependence	26	3.5	2.2–4.8	57	7.7	5.8–9.6
<i>Any substance use disorder</i>	81	10.9	8.6–13.1	164	22.0	19.1–25.0
<i>Any psychiatric disorder</i>	230	30.9	27.6–34.2	339	45.6	42.0–49.1
<i>Any psychiatric disorder (excluding nicotine)</i>	195	26.2	23.0–29.4	313	41.4	38.5–45.6

^aBecause women can have more than one diagnosis in a category, the total number may be less than the sum of individual diagnoses.

^bLifetime prevalence of oppositional disorder is less than the current prevalence, because an individual with a current diagnosis can meet criteria for oppositional, conduct, and antisocial personality simultaneously. For a lifetime disorder, the exclusion criteria stipulate that only the most severe of the three diagnoses can be assigned.

WIC, Women, Infants and Children.

rate was 26.2%. The most common categories of disorders were affective disorders (13.6%), anxiety disorders (13.0%), and substance abuse or dependence disorders (10.9%). For affective disorders, 8.2% of the participants met criteria for major depressive disorder and 5.2% for bipolar I disorder. The most common anxiety diagnoses were PTSD (7.7%), followed by generalized anxiety disorder (3.6%), social phobias (2.7%), and specific phobias (2.4%). Nicotine dependence was the most frequent type of substance use disorder, with a rate of 8.3%. Few women met criteria for alcohol abuse or dependence (1.1%).

When comparing 12-month prevalence rates between Caucasian and African American participants (Table 3), Caucasians were more likely to have one or more psychiatric disorders (36.4% and 26.9%, respectively). However, when nicotine dependence was excluded from the diagnostic count,

the rates between the two groups were nearly identical. The 12-month prevalence of nicotine dependence for Caucasians (16.5%) was more than seven times the rate for African Americans (2.3%). Caucasian subjects were also more likely to have panic disorders (2.9% and 0.0%, respectively). No other 12-month individual diagnoses or diagnostic categories were significantly different by race. There were also no significant differences in 12-month prevalence rates between participants from rural and urban communities (Table 4).

Nearly 46% of pregnant women in this study had at least one lifetime psychiatric disorder. When nicotine dependence was excluded, the prevalence decreased to 41.4% (Table 2). The most common lifetime psychiatric diagnostic categories were affective disorders, anxiety disorders, and substance abuse/dependence. Nearly 24% met lifetime criteria for an affective disorder, with the most common individual diagnosis

TABLE 3. PREVALENCE OF 12-MONTH PSYCHIATRIC DISORDERS IN 744 AFRICAN AMERICAN AND CAUCASIAN PREGNANT WOMEN

Psychiatric disorder	African American (n = 428)						Caucasian (n = 316)					
	12-month			Lifetime			12-month			Lifetime		
	No.	%	95% C.I.	No.	%	95% C.I.	No.	%	95% C.I.	No.	%	95% C.I.
Affective disorders												
Major depressive disorder	31	7.2	4.8–9.7	59	13.1	9.9–16.3**	30	9.5	6.3–12.7	64	20.3	15.8–24.7**
Dysthymia	0	0.0	0.0–0.0	0	0.0	0.0–0.0	1	0.3	0.0–0.9	2	0.6	0.0–1.5
Bipolar I	21	4.9	2.9–7.0	24	5.6	3.4–7.8	18	5.7	3.1–8.3	28	8.9	5.7–12.0
Bipolar II	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Any affective disorder	52	12.2	9.1–15.2	83	19.4	15.6–23.1***	49	15.5	11.5–19.5	92	29.1	24.1–34.1***
Anxiety disorder												
Generalized anxiety disorders	13	3.0	1.4–4.7	15	3.5	1.8–5.2	14	4.4	2.2–6.7	16	5.1	2.7–7.5
Agoraphobia	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0	2	0.6	0.0–1.5
Panic disorder	0	0.0	0.0–0.0**	0	0.0	0.0–0.0**	8	2.5	0.8–4.3**	9	2.9	1.0–4.7***
Specific phobia	8	1.9	0.6–3.2	16	3.7	1.9–5.5	10	3.2	1.2–5.1	19	2.9	1.0–4.7***
Social phobia	8	1.9	0.6–3.2	16	3.7	1.9–5.5	12	3.8	1.7–5.9	16	5.1	2.7–7.5
Obsessive compulsive disorder	3	0.7	0.0–1.5	5	1.2	0.2–2.2	3	1.0	0.0–2.0	9	2.9	1.0–4.7
Posttraumatic stress disorder	27	6.3	4.0–8.6	53	12.4	9.3–15.5	30	9.5	6.3–12.7	54	17.1	12.9–21.2
Any anxiety disorder	48	11.2	8.2–14.2	83	19.4	15.6–23.1*	50	15.8	11.8–19.8	81	25.6	20.8–30.4*
Psychotic disorders												
Schizoaffective disorder	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Schizophreniform	0	0.0	0.0–0.0	2	0.5	0.0–1.1	0	0.0	0.0–0.0	6	1.9	0.4–3.4
Schizophrenia	2	0.5	0.0–1.1	5	1.2	0.2–2.2	1	0.3	0.0–0.9	3	1.0	0.0–2.0
Any psychotic disorder	2	0.5	0.0–1.1	7	1.6	0.4–2.8	1	0.3	0.0–0.9	7	2.2	0.6–3.8
Behavior disorders												
Oppositional disorder	24	5.6	3.4–7.8	16	3.7	1.9–5.5	12	3.8	1.7–5.9	10	3.2	1.2–5.1
Conduct disorder	7	1.6	0.4–2.8	13	3.0	1.4–4.7	2	0.6	0.0–1.5	7	2.2	0.6–3.8
Antisocial personality disorder	0	0.0	0.0–0.0	1	0.2	0.0–0.7*	0	0.0	0.0–0.0	5	1.6	0.2–3.0*
Any behavioral disorder	26	6.1	3.8–8.3	30	7.0	4.6–9.4	13	4.1	1.9–6.3	22	7.0	4.2–9.8
Eating disorder												
Anorexia	0	0.0	0.0–0.0	1	0.2	0.0–0.7*	1	0.3	0.0–0.9	5	1.6	0.2–3.0*
Bulimia	0	0.0	0.0–0.0	0	0.0	0.0–0.0	1	0.3	0.0–0.9	1	0.3	0.0–0.9
Any eating disorder	0	0.0	0.0–0.0	1	0.2	0.0–0.7*	2	0.6	0.0–1.5	6	1.9	0.4–3.4*
Any attention deficit hyperactivity disorder	5	1.2	0.2–2.2	10	2.3	0.9–3.8**	10	3.2	1.2–5.1	20	6.3	3.6–9.0**
Substance use disorders												
Nicotine dependence	10	2.3	0.9–3.8***	21	4.9	2.9–7.0***	52	16.5	12.4–20.5***	80	25.3	20.5–30.1***
Alcohol abuse or dependence	5	1.2	0.2–2.2	23	5.4	3.2–7.5***	3	1.0	0.0–2.0	40	12.7	9.0–16.3***
Drug abuse or dependence	9	2.1	0.7–3.5*	23	5.4	3.2–7.5**	17	5.4	2.9–7.9*	34	10.8	7.3–14.2**
Any substance use disorder	20	4.7	2.7–6.7***	50	11.7	8.6–14.7***	61	19.3	15.0–23.7***	114	36.1	30.8–41.4***
Any psychiatric disorder	115	26.9	22.7–31.1**	159	37.1	32.6–41.7***	115	36.4	31.3–41.7**	180	57.0	51.5–62.4***
Any psychiatric disorder (excluding nicotine)	112	26.2	22.0–30.3	155	36.2	31.7–40.8***	83	26.3	21.4–31.1	158	50.0	44.5–55.5***

* $p < .05$, ** $p < .01$, *** $p < .001$.

being major depressive disorder (16.1%). Anxiety disorders occurred in 22% of subjects, with PTSD being the most common (14.4%). Less prevalent diagnoses were specific phobias (4.7%), social phobias (4.3%), and generalized anxiety disorder (4.2%). The lifetime prevalence of substance abuse/dependence was 22.0%, with nicotine dependence being most common (13.6%), followed by alcohol abuse/dependence (8.5%) and drug abuse/dependence (7.7%).

Caucasian mothers had a higher lifetime prevalence of psychiatric disorders than African American mothers (57.0% and 37.1%, respectively). Even with the exclusion of nicotine dependence, a statistically significant difference remained (Table 3). More than one fourth of Caucasians reported lifetime nicotine dependence (25.3%) compared to only 4.9% of African Americans. Similarly, Caucasian women had nearly twice the rates of both alcohol and drug abuse/dependence.

Statistically significant differences in lifetime affective disorders were also found, with major depressive disorder accounting for most of the effect. The lifetime rate of major depressive disorder was 20.3% for Caucasians and only 13.1% for African Americans. Caucasian women met lifetime criteria for attention deficit hyperactivity disorder (ADHD) nearly three times more often than African American women (6.3% and 2.3%, respectively).

There were no statistically significant differences in prevalence of psychiatric diagnoses by urban or rural residence (Table 4). The overall prevalence of any psychiatric disorder was 48.5% for urban residents and 43.5% for those living in rural areas. Three individual diagnoses approached significance. Major depressive disorder was higher in urban women (19.3%) compared to rural women (13.9%). Urban women also had a somewhat higher rate of PTSD (17.0%

TABLE 4. PREVALENCE OF 12-MONTH PSYCHIATRIC DISORDERS BY RURAL AND URBAN RESIDENCE OF 744 WIC-ENROLLED PREGNANT WOMEN

Psychiatric disorder	Rural (n = 439)						Urban (n = 305)					
	12-month			Lifetime			12-month			Lifetime		
	No.	%	95% C.I.	No.	%	95% C.I.	No.	%	95% C.I.	No.	%	95% C.I.
Affective disorders												
Major depressive disorder	31	7.1	4.7–9.5	61	13.9	10.7–17.1	30	9.8	6.5–13.2	59	19.3	14.9–23.8
Dysthymia	1	0.2	0.0–0.7	2	0.5	0.0–1.1	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Bipolar I	24	5.5	3.3–7.6	31	7.1	4.7–9.5	15	4.9	2.5–7.3	21	6.9	4.0–9.7
Bipolar II	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Any Affective Disorder	56	12.8	9.6–15.9	94	21.4	17.6–25.2	45	14.8	10.8–18.7	81	26.6	21.6–31.5
Anxiety disorders												
Generalized anxiety disorders	17	3.9	2.1–5.7	17	3.9	2.1–5.7	10	3.3	1.3–5.3	14	4.6	2.2–6.9
Agoraphobia	0	0.0	0.0–0.0	1	0.2	0.0–0.7	0	0.0	0.0–0.0	1	0.2	0.0–1.0
Panic disorder	5	1.1	0.1–2.1	6	1.4	0.3–2.5	2	0.7	0.0–1.6	3	1.0	0.0–2.1
Specific phobia	13	3.0	1.4–4.5	21	4.8	2.8–6.8	5	1.6	0.2–3.1	14	4.6	2.2–6.9
Social phobia	9	2.1	0.7–3.4	13	3.0	1.4–4.5*	11	3.6	1.5–5.7	19	6.2	3.5–8.9*
Obsessive compulsive disorder	4	0.9	0.0–1.8	9	2.1	0.7–3.4	2	0.7	0.0–1.6	5	1.6	0.2–3.1
Posttraumatic stress disorder	34	7.7	5.2–10.2	55	12.5	9.4–15.6	23	7.5	4.6–10.5	52	17.0	12.8–21.3
Any anxiety disorder	58	13.2	10.0–16.4	88	20.0	16.3–23.8	40	13.1	9.3–16.9	76	24.9	20.1–29.8
Psychotic disorders												
Schizoaffective disorder	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Schizophreniform	0	0.0	0.0–0.0	6	1.4	0.3–2.5	0	0.0	0.0–0.0	2	0.7	0.0–1.6
Schizophrenia	0	0.0	0.0–0.0	4	0.9	0.0–1.8*	3	1.0	0.0–2.1	4	1.3	0.0–2.6*
Any psychotic disorder	0	0.0	0.0–0.0	9	2.1	0.7–3.4	3	1.0	0.0–2.1	5	1.6	0.2–3.1
Behavior disorders												
Oppositional disorder	26	5.9	3.7–8.1	13	3.0	1.4–4.5	10	3.3	1.3–5.3	13	4.3	2.0–6.5
Conduct disorder	5	1.1	0.1–2.1	12	2.7	1.2–4.3	4	1.3	0.0–2.6	8	2.7	0.8–4.4
Antisocial personality disorder	0	0.0	0.0–0.0	3	0.7	0.0–1.5	0	0.0	0.0–0.0	3	1.0	0.0–2.1
Any behavioral disorder	27	6.2	3.9–8.4	28	6.4	4.1–8.7	12	3.9	1.8–6.1	24	7.9	4.8–10.9
Eating disorder												
Anorexia	0	0.0	0.0–0.0	4	0.9	0.0–1.8	1.0	0.3	0.0–1.0	2	0.7	0.0–1.6
Bulimia	1	0.2	0.0–0.7	1	0.2	0.0–0.7	0	0.0	0.0–0.0	0	0.0	0.0–0.0
Any eating disorder	1	0.2	0.0–0.7	5	1.1	0.1–2.1	1	0.3	0.0–1.0	2	0.7	0.0–1.6
Any attention deficit hyperactivity disorder	12	2.7	1.2–4.3	18	4.1	2.2–6.0	3	1.0	0.0–2.1	12	3.9	1.8–6.1
Substance use disorders												
Nicotine dependence	40	9.1	6.4–11.8	60	13.9	0.5–16.9	22	7.2	4.3–10.1	41	13.4	9.6–17.3
Alcohol abuse or dependence	5	1.1	0.1–2.1	39	8.9	6.2–11.5	3	1.0	0.0–2.1	24	7.9	4.8–10.9
Drug abuse or dependence	13	3.0	1.4–4.5	30	6.8	4.5–9.2	13	4.3	2.0–6.5	27	8.9	5.7–12.0
Any substance use disorder	52	11.8	8.8–14.9	96	21.9	18.0–25.7	29	9.5	6.2–12.8	68	22.3	17.6–27.0
Any psychiatric disorder	135	30.8	26.4–35.1	191	43.5	38.9–48.1	95	31.2	26.0–36.3	148	48.5	42.9–54.1
Any psychiatric disorder (excluding nicotine)	111	25.3	21.2–29.4	173	9.4	34.8–44.0	84	27.5	22.5–32.6	140	45.9	40.3–51.5

* $p < .05$.

and 12.5%, respectively), and social phobia occurred twice as often in urban women (6.2%) compared to rural women (3.0%). Simultaneous stratification by race and urban/rural residence was not possible because of small cell sizes and unstable prevalence estimates with very wide confidence intervals.

When examining comorbid 12-month psychiatric diagnoses, 13.7% of the sample met criteria for two or more diagnoses, while 17.2% met criteria for only one. More than one fourth met criteria for two or more lifetime psychiatric disorders, and another 20.4% met criteria for a single diagnosis. There were no statistically significant differences in the number of 12-month or lifetime comorbid diagnoses by race or urban/rural residence.

Of the 230 pregnant women who met criteria for a 12-month psychiatric diagnosis, only 24.3% reported receiving

treatment in the past year (Table 5). Another 19.1% said that they wanted treatment but did not receive it, and the remaining 56.6% said that they did not want treatment. There was no significant difference by race. Pregnant women with generalized anxiety disorder were the most likely to have received treatment (48.1%), followed by those with major depressive disorder (37.7%) and ADHD (26.7%). Women with bipolar I disorder were the least likely to report treatment (12.8%). The diagnosis with the most women who wanted treatment but did not receive it was social phobia (40.0%), followed by major depressive disorder (36.2%) and PTSD (31.6%). Rural women with a psychiatric diagnosis were less likely to receive treatment than urban women (20.7% compared to 29.5%) and were more likely to desire treatment but not receive it (25.3% and 14.8%, respectively) ($\chi^2 = 9.57$, $p < .05$).

TABLE 5. PREVALENCE OF TREATMENT FOR PREGNANT WOMEN WITH 12-MONTH PSYCHIATRIC DIAGNOSES

<i>Psychiatric disorder</i>	<i>No. with disorder</i>	<i>Treatment wanted, treated %</i>	<i>Treatment wanted, not treated %</i>	<i>Treatment not wanted %</i>	<i>Treatment status unknown %</i>
Affective disorders^a					
Major depressive disorder	61	37.7	36.2	34.4	1.6
Dysthymia	1	^b	^b	^b	^b
Bipolar I	39	12.8	28.2	56.4	2.6
Bipolar II	0	0	0	0	0
<i>Any affective disorder</i>	101	27.7	27.7	42.6	2
Anxiety disorders					
Generalized anxiety disorders	27	48.1	29.6	22.2	0
Agoraphobia	0	0.0	0.0	0	0
Panic disorder	7	^b	^b	^b	^b
Specific phobia	18	22.2	11.1	38.9	27.8
Social phobia	20	25.0	40.0	35	0
Obsessive compulsive disorder	6	^b	^b	^b	^b
Posttraumatic stress disorder	57	26.3	31.6	42.1	0
<i>Any anxiety disorder</i>	98	28.9	25.8	40.2	5.2
Psychotic disorders					
Schizophrenia	3	^b	^b	^b	^b
Schizophreniform	0	0	0	0	0
Schizoaffective disorder	0	0	0	0	0
<i>Any psychotic disorder</i>	3	^b	^b	^b	^b
Behavior disorders					
Oppositional disorder	36	25.0	30.6	44.4	0
Conduct disorder	9	^b	^b	^b	^b
Antisocial personality disorder	0	0	0	0	0
<i>Any behavioral disorder</i>	39	23.1	30.8	46.2	0
Eating disorder					
Anorexia	1	^b	^b	^b	^b
Bulimia	1	^b	^b	^b	^b
<i>Any eating disorder</i>	2	^b	^b	^b	^b
<i>Any attention deficit hyperactivity disorder</i>	15	26.7	26.7	46.7	0
Substance use disorders					
Nicotine dependence	62	24.2	14.5	61.3	0
Alcohol abuse or dependence	8	^b	^b	^b	^b
Drug abuse or dependence	26	19.2	26.9	53.8	0
<i>Any substance use disorder</i>	81	22.2	13.6	64.2	0
<i>Any psychiatric disorder</i>	230	24.3	19.1	53	0
<i>Any psychiatric disorder (excluding nicotine)</i>	195	26.2	22.1	47.7	4.1

Treatment was defined broadly as speaking with a professional about symptoms. Respondents reporting symptoms in the past 12 months were asked if they wanted to speak with a doctor or other professionals about their symptoms and whether they had done so. Other professionals included social workers, nurses, psychologists, counselors, clergy, dentists, chiropractors, or healers.

^aDeviations from 100% are because of rounding error.

^bPercentages by treatment category were not calculated when there were fewer than 10 cases.

Discussion

This community-based study estimated the 12-month and lifetime prevalence of multiple DSM-IV psychiatric disorders in 744 pregnant women. Not only did it build on earlier research that focused on symptoms of psychiatric illness and often used clinical samples, it added to recent research on DSM-IV psychiatric disorders. Because recruitment in this study occurred at WIC sites, it provided an opportunity to include low-income women in the sample who did and did not receive prenatal care. The program provided vouchers for food, making it an attractive resource for women even before they began prenatal care. WIC recipients are also more likely to receive prenatal care at some point in their pregnancy since this is a high priority of the program.

At the time women were recruited into the study, 85% of eligible pregnant women in the state of Missouri participated in WIC. The sociodemographic characteristics of the sample in this study and the population of pregnant Medicaid WIC recipients in the state of Missouri during 2000–2001 were remarkably similar,⁴⁰ which lends credibility to the representativeness of the sample to statewide WIC recipients who were either on Medicaid or who were Medicaid-eligible. The majority of women in both groups were not married (78.3% and 75.1%, respectively). Two out of five had not finished high school (41.8% and 43.5%, respectively). The majority of women in both groups were not employed. The mean total number of employed hours in the past 12 months for study mothers was 4.5 hours, while 73.9% of Missouri WIC pregnant mothers were unemployed at WIC entry. Both groups were very young

(mean of 22.2 years and 58.6% aged 24 or under). The percentages of women pregnant with their first child were essentially identical. Comparisons by race and rural/urban residence could not be made, since the sample in this study was proportionately stratified by these characteristics.

The prevalence of having one or more psychiatric disorders during the previous 12 months was 30.9% in this study. Despite using different instruments to measure psychiatric disorders, similar estimates were reported for pregnant women in the national probability sample used by Vesga-Lopez and colleagues²¹ and for low-income pregnant teenagers in Brazil.²⁰ Andersson and colleagues¹⁹ reported a second-trimester point prevalence of 14.1% for any current disorder in a sample of pregnant women receiving prenatal care in Sweden. These rates are not directly comparable for several reasons. First, point prevalence estimates include only those subjects meeting full criteria at the assessment, while the 12-month period prevalence in this study included subjects meeting full criteria at any point in the past 12 months. Secondly, Andersson and colleagues screened for only 13 categories of the most commonly occurring diagnoses, whereas this study covered 22 diagnoses.

Similar to other studies,^{19,25} affective disorders were the most common category for both 12-month and lifetime disorders. Major depressive disorder (8.2%) was the most prevalent diagnosis in this category, which is similar to the 8.4% rate reported by Vesga-Lopez and colleagues.²¹ Not only are women at high risk for this disorder in pregnancy,^{27,41} its negative association with birth outcomes, postpartum mother-child relationships, and child development is well established.^{2,10,42,43} Of particular concern in this study is that only 27.7% of the women with an affective disorder in the past year had received any treatment. This low rate is particularly concerning since treatment was defined broadly in the DIS-IV as talking to a physician, counselor, or other health professional about behaviors, feelings, or symptoms related to the disorder. An individual did not specifically have to receive mental healthcare. Vesga-Lopez and colleagues²¹ used a narrower definition of treatment and reported a 10.5% rate of mental health service use for pregnant women with one or more psychiatric disorders. In this study women with major depressive disorder were somewhat more likely to have received treatment (37.7%), but only 12.8% with bipolar I were treated. These findings are consistent with other studies in the literature indicating that most depressed pregnant women do not receive mental health treatment.³

Another important finding in this study is the high 12-month prevalence of bipolar I disorder (5.2%). In their national probability study Kessler and colleagues⁴⁴ reported a combined 12-month prevalence of 2.6% for both bipolar I and II disorders. Vesga-Lopez and colleagues²¹ reported a 12-month prevalence of 2.8% in pregnant women, while Andersson and colleagues reported a point prevalence of 3.9% in Swedish women receiving prenatal clinic care.¹⁹ The higher rates in this study are likely related to the relatively young and exclusively low-income nature of the sample, supported by other studies with samples of economically disadvantaged young adults.⁴⁵ From a clinical perspective, there is an elevated risk of relapse and hospitalization for bipolar I disorder during pregnancy,⁴⁶ as well as an added risk when mood-stabilizing drugs are withdrawn abruptly.⁴⁷ Bipolar disorders can be undiagnosed or misdiagnosed as unipolar depression,

with the inappropriate use of antidepressant monotherapy.⁴⁸ Sharma and colleagues report that more than one third of 61 cases identified as treatment-resistant depression actually were bipolar.⁴⁹ Further research needs to investigate how often inadequate detection and misdiagnosis occur in prenatal care. The very low treatment rate for bipolar I disorder (12.8%) is of concern given the severe nature of this disorder.⁴⁴ For those who do receive treatment, health providers must assess any fetal risk associated with mood stabilizing drugs.^{46,47,50}

The 12-month prevalence of anxiety disorders (13.2%) in this study was similar to the rates reported in the literature for pregnant women.^{19,25,21} Few studies have investigated the prevalence of PTSD in pregnancy, particularly among economically disadvantaged and ethnically diverse women. However, the 7.7% prevalence estimate in this study is similar to the 8.1% reported by Ayers and Pickering for pregnant Caucasian women.⁵¹ The 12-month prevalence of drug abuse/dependence (3.5%) is also similar to rates reported in earlier studies,^{52,53} although it is higher than the 1.6% reported for pregnant or postpartum women by Vasga-Lopez and colleagues²¹ in their general population sample. The rate of alcohol abuse/dependence (1.1%) was similar to other studies of young low-income nonpregnant women.⁵³ It was lower than studies with national probability samples that included a wide range of ages.²¹ It is not uncommon for prenatal alcohol, tobacco, and illicit drug use to be underreported, given their widely known negative effects during pregnancy.^{54,55} Media attention was focused to target substance use in pregnancy during the time the data were collected for this study.^{56,57} The review of tape-recorded interviews for quality control did not reveal deviations in the assessment for substance abuse or dependence, but being tape-recorded may have contributed to the underreporting of these potentially harmful behaviors.

The rates for ADHD in this study are similar to those reported for female children in the 2003 national survey of children's health. Based on parents' self-reporting, they estimated that 5.4% of children between the ages of 13 to 17 had been diagnosed with ADHD.⁵⁸ This study found that 4.0% of the mostly young adult women met DSM-IV lifetime criteria. This lower rate is probably related to having more than 50% being African Americans in the sample, since lower ADHD rates have been found in this population.⁵⁸ Caucasians were nearly three times as likely to meet criteria than African Americans (6.3% and 2.3%, respectively).

Also striking was the sevenfold difference by race in the 12-month prevalence of nicotine dependence and fivefold difference in the lifetime rate. Historically young African American women in Missouri have used tobacco at much lower rates than Caucasians and African Americans nationally.⁵⁹ As African American women become older, their rates begin to approximate those of Caucasians. The African American sample in this study was young, with a lower rate of tobacco use (35%) and nicotine dependence (2.3%). The rates for Caucasian women were high (16.5%). By comparison, rates from a general population sample reported that 12.4% of pregnant women met criteria for tobacco dependence.⁶⁰ For both groups, the adverse effects of smoking on birth outcomes are well documented. Nicotine dependence also can be a marker for psychiatric disorders, a finding described earlier by Flick and colleagues.⁶¹ Continued efforts to help women stop or reduce tobacco use before and during

pregnancy are of primary importance⁶² and may require attention to specific psychiatric disorders to be effective.⁶³

Differences in the overall 12-month prevalence of psychiatric disorders between African American and Caucasian women can be explained by nicotine dependence. When cases with a sole diagnosis of nicotine dependence are excluded, there is no significant difference between the two groups. A different picture emerges for mothers with at least one disorder at some point in their lifetime. Even with nicotine dependence excluded, Caucasian women have a higher lifetime prevalence of psychiatric disorders than African American women in this study. When all substance use disorders are excluded (nicotine, drug, or alcohol), Caucasian women remain three times more likely to meet lifetime criteria for a disorder than African Americans. African American women tend to begin substance use later in life than Caucasian women and to have lower rates of use in pregnancy. The findings in this study are consistent with this observation and cannot be attributed to age differences by race since the mean ages of the two groups were similar (mean age = 22.3, SD = 5.1; and 22.1, SD = 5.3, respectively; $t_{743} = -.37$, ns, not significant).

The only other significant lifetime difference by race occurs among affective disorders, with Caucasians having a prevalence of 29.1% compared to 19.4% for African Americans. These findings parallel those found in nationally representative prevalence studies even after adjusting for socio-demographic characteristics.^{64,65} Higher rates of depression in African American women have been reported in some studies,⁶⁶ but they focus on symptoms of depression, rather than the diagnoses used in this study. Furthermore, differences by race disappear when adjusting for variables such as lower income, financial hardships, and young maternal age. Another consideration is that diagnostic differences could partially be explained by cultural differences in the validity of the DIS-IV; that is, there may be differences in the language used to describe a particular symptom or even in the recognition of which symptoms are commonly acknowledged as part of a disorder. Heurtin-Roberts and colleagues conducted an ethnographic study with subjects who had participated in the Epidemiological Catchment Area study using the DIS.⁶⁷ They found differences by education but not by ethnicity in how anxiety symptoms are described.

This study compared the prevalence of psychiatric diagnoses of pregnant women from rural and urban communities. An important finding was that pregnant women from rural communities were significantly less likely to receive treatment than their counterparts in urban settings, despite having similar prevalence rates of psychiatric disorders. Furthermore, significantly more rural women who did not receive treatment wanted these services. These findings support national recognition of health service disparities in rural communities and the need to strengthen mental health services for rural America.

Strengths and limitations

This study is one of the first few to investigate the prevalence of multiple DSM-IV psychiatric disorders in a community sample of pregnant women. The sampling method involved the recruitment of low-income WIC recipients from one inner city and five rural counties in the state of Missouri

who were proportionally enrolled by race (African American and Caucasian) in each county's WIC program(s). At the time the study was conducted, Missouri WIC programs served 85% of eligible pregnant women in the state. While the findings can be generalized to low-income African American and Caucasian WIC recipients in their respective counties and perhaps statewide, the study did not represent all low-income pregnant women. A longitudinal national probability sample of pregnant women is expensive but would contribute to a more comprehensive understanding of this issue, as well as changes in psychiatric disorders over the course of pregnancy. The National Children's Study, currently in its pilot phase in 7 U.S. counties could potentially provide such a sample.⁶⁸

One consideration in this study was the variation in gestation at the time the women were interviewed, which introduced differences in the proportion of the pregnancy covered in the 12-month prevalence estimates. However, nearly 80% of the sample was interviewed during their second or third trimester. An important consideration for future research is to investigate differences in the prevalence of psychiatric disorders over the course of pregnancy.

While the validity of the DIS has been tested in other populations, it has not been specifically validated for use in pregnancy. Concerns arise when symptoms of psychiatric disorders overlap with common symptoms of pregnancy, such as changes in appetite and sleep patterns. Pregnancy symptoms could account for the overestimation of diagnoses related to depression or eating disorders. However, the overall prevalence rates for pregnant women in this study are remarkably similar to those for women of childbearing age in national probability studies. Another consideration is that adjustment for all variables was not possible in this study. While sampling controlled for urban/rural residence, race, and poverty, prevalence estimates were not adjusted for other sociodemographic variables because of limitations of cell sizes for diagnoses with low prevalence. Lastly, the 12-month and lifetime prevalence of substance use disorders in this study were based on self-reported use and symptoms. Without biological confirmation, this self-report method likely produced underestimates of abuse or dependence prevalence rates.⁶⁹

Conclusions

In this community-based study of psychiatric disorders in pregnancy, nearly one third of the low-income sample met criteria for one of 22 diagnoses within the last 12 months, and almost one half met criteria over their lifetime. The most prevalent 12-month diagnostic categories were affective and anxiety disorders, while the most prevalent individual diagnoses were nicotine dependence, major depressive disorder, PTSD, and bipolar I disorder. For lifetime diagnoses, the most prevalent diagnostic category was affective disorders. When not including nicotine dependence, there were no differences between African American and Caucasian women in the 12-month prevalence rates for one or more disorders. There also were no substantial differences by rural or urban residence. While this study enrolled WIC recipients in southeastern Missouri and the city of St. Louis, comparisons between this sample and the statewide population of pregnant WIC recipients yielded similar sociodemographic characteristics. This lends some credibility to the findings being representative of statewide Medicaid or Medicaid-eligible WIC recipients.

Only one out of four pregnant women with a 12-month psychiatric diagnosis in this study had received any type of treatment. Rural women were less likely to be treated than urban women. Other studies have reported similar findings, and some cite lack of detection of psychiatric illness during prenatal care as a contributing factor.^{70,71,21} A comprehensive screening tool for multiple psychiatric disorders is needed that is practical to use in obstetrical practice. Further research is needed to determine whether better identification and treatment of psychiatric illness in pregnancy can improve outcomes for infants and mothers.

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Disclosure Statement

Dr. Cook and her co-authors report no competing interests and have no conflicts of interest.

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