

Racial/Ethnic Differences in Depressive Symptoms Among Young Women: The Role of Intimate Partner Violence, Trauma, and Posttraumatic Stress Disorder

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Abstract

Purpose: It is unclear why rates of depression differ by race/ethnicity among young women. This study examines whether racial/ethnic differences in depressive symptoms are reduced by intimate partner violence (IPV), traumatic events, and posttraumatic stress disorder (PTSD) symptoms among a clinical sample of low-income women.

Methods: A cross-sectional sample of 2414 young African American, Hispanic, and white women completed a survey that included questions about depression, PTSD symptoms, IPV, and trauma. Binary logistic regression and Poisson regression determined whether reports of PTSD symptoms, IPV, and trauma among white, African American, and Hispanic women affected the differences in depression found in these groups.

Results: Twenty-four percent reported a level of depressive symptoms that warranted further evaluation for major depressive disorders. White women had elevated levels of depressive symptoms and were more likely to report ≥ 4 symptoms. White women also reported higher rates of PTSD symptoms, IPV, and traumatic events than African American or Hispanic women. Differences in the likelihood of reporting ≥ 4 depressive symptoms by race/ethnicity were reduced after controlling for PTSD symptoms and trauma. PTSD symptoms attenuated the differences in the count of depressive symptoms between white and African American women. After controlling for PTSD symptoms, trauma attenuated the difference in the count of depressive symptoms between Hispanic and white women.

Conclusions: Elevated levels of trauma and PTSD symptoms among white women compared to African American or Hispanic women may play a role in observed racial/ethnic differences in depressive symptoms.

Introduction

WOMEN FACE A HIGH RISK OF DEPRESSION compared to men and are at particularly high risk during their reproductive years.^{1,2} Variations in depression among different racial/ethnic groups have been documented, but it is not clear which racial/ethnic groups are more likely to experience depression because conclusions vary among studies. Some studies have observed that Mexican Americans and African Americans have a higher level of depressive symptoms than whites, particularly among females.³⁻⁵ Other researchers, however, have shown that whites have higher rates of depression than African Americans or Hispanics.^{6,7} According to one national study, white men and women in the United States have a lower rate of current depression but have the highest rate of ever receiving a diagnosis of depression.⁸ It is

unlikely that biologic differences are to blame for racial/ethnic differences in rates of depression, as race and ethnicity are more of a social construct than a result of genetic variation.^{9,10} More research needs to focus on factors that affect racial/ethnic disparities in depression among young women from low-income backgrounds, as these women have an increased risk of experiencing events that may affect the development of depression.

González et al.³ found that Mexican Americans and African Americans have a higher risk of chronic major depression, but both groups are less likely than whites to report receiving care for depression, even after reporting severe depressive symptoms. Another national study indicates that white men and women in the United States have a lower rate of current depression but have the highest rate of ever receiving a diagnosis of depression.⁸ Other research has shown

that African Americans or Hispanics have a decreased likelihood of reporting lifetime depression compared to whites or that depressive symptoms do not vary significantly by race/ethnicity.^{6,7,11} Reasons for these variations may be many, such as differences in measurement of depression between studies, levels of medication or mental health care within the population being studied, and differences in life circumstances.

Explanations for racial/ethnic variations in depression among women, such as life circumstances, should be evaluated to determine their role in racial/ethnic variations in depression. Some life circumstances, such as intimate partner violence (IPV), traumatic events, and the development of posttraumatic stress disorder (PTSD), may be particularly important contributors to depressive symptoms among young low-income women from diverse racial/ethnic backgrounds.^{12,13} As life circumstances vary across racial/ethnic groups because of the differences in environment and resources within each group, they are likely to contribute to variations in depression by race/ethnicity among young women across different studies.^{14–16}

Life circumstances are especially important to consider as factors in racial/ethnic differences in depression, which is found among young females. Although IPV is associated with many health issues among women, its most common manifestations are PTSD and depression.¹⁷ In addition to the traumatic effects of IPV, there are more general types of trauma that occur commonly among women and are likely to contribute to depression. In a nationally representative sample of women, 69% reported experiencing at least one type of trauma during their lifetime, including rape, sexual assault, physical assault, homicide of family or close friend, crime victimization, or other noncrime trauma.¹⁸ These high rates of traumatic events among women are of concern, as they contribute to women's mental health issues, such as depression.^{12,19–21} In addition to depression, traumatic events can have other serious consequences for women's mental health, including PTSD. PTSD can cause women to withdraw from their normal daily activities and support systems and increase hypervigilance, which may impact health and well-being and is a condition that is often a comorbidity of depression.^{22–24}

The prevalence of trauma, IPV, and PTSD may vary between communities, and these three life circumstances are associated with depressive symptoms.^{13,25,26} That these circumstances have a variable prevalence in different racial/ethnic groups of women or are more likely to cause depression among a particular group of women could explain differences in depression by racial/ethnic group. Further, clustering of violence and other factors that are associated with trauma, IPV, and PTSD symptoms among different regions or communities could explain why results have been inconsistent across different studies.

It is important to consider whether trauma, IPV, and PTSD contribute to differences in risk of developing depression among young low-income women. These life circumstances are prevalent among low-income women and may contribute to racial/ethnic variations in depression.^{14,16} This study addresses whether differences in the likelihood of reporting a high number of depressive symptoms among young women of different racial/ethnic backgrounds are attributable to traumatic events, IPV, or PTSD symptoms. This study also investigates if IPV, traumatic events, and PTSD symptoms

reduce the difference in the level of depressive symptoms in young African American, Hispanic, and white women.

Materials and Methods

Participants and procedure

A survey developed to measure health behaviors was administered to 3181 females, aged 16–24 years, who visited one of the five publicly funded family planning clinics that were included in the study in South Texas between August 2008 and July 2010. The clinics were all located in urban areas, but women may have traveled from rural locations to access the facilities. Each respondent who completed the self-administered survey, which was available in both English and Spanish, was compensated \$5 for her time. A respondent could take the survey only one time. The survey was approved by the Institutional Review Board (IRB) of the University of Texas Medical Branch, Galveston, TX.

Race was self-reported as Hispanic, African American, or white. Women of Asian, American Indian/Alaskan Native, or Native Hawaiian or other Pacific Islander were excluded because not enough women indicated they were of these ethnic backgrounds to make a meaningful comparison. In addition, women who participated before the Beck Depression Inventory for Primary Care (BDI-PC) was added to the survey were excluded from this study. After applying the exclusion criteria, 2414 of the original 3181 participants were included in the study. Forty-three percent were Hispanic ($n = 1042$), 27% were African American ($n = 649$), and 30% were white ($n = 723$). Over half of Hispanic women were born in the United States (52.5%). Of the Hispanic women not born in the United States, 90% were born in Mexico, 4.4% were born in Honduras, 3.2% were born in El Salvador, and the remaining 2.2% of foreign-born Hispanics were from Nicaragua, Guatemala, Puerto Rico, Uruguay, and Peru or were born in an unknown location. Of the 2414 women, 319 (13.2%) took the survey in Spanish.

Measures

Depressive symptoms. Depressive symptoms experienced in the past 2 weeks were reported by the respondents on the BDI-PC. The BDI-PC consists of seven items reflecting cognitive and affective symptoms, with the score for each item ranging from 0 to 3 and total possible scores ranging between 0 (no depression) and 21 (the highest level of depression). The BDI-PC is often used by primary care physicians to screen for depression among their patients. This measure had a good internal consistency and good sensitivity and specificity for diagnosing patients at risk of major depressive disorders (MDD) in other studies and was moderately correlated with the Hospital Anxiety and Depression Scale.^{27,28} For this study, internal consistency reliability was good (Cronbach's $\alpha = 0.86$) for the BDI-PC and was similar to the internal consistency of 0.85 found in another study.²⁷

For the first part of the analyses, respondents with a score of ≥ 4 were considered at risk of depression, and respondents with < 4 symptoms were considered not at risk. A cutoff of 4 was determined to have the best combined sensitivity (97%) and specificity (99%) for identifying patients with and without MDD in an examination of the measure's properties in another study.²⁸ The cutoff value of 4 was also found to yield the highest sensitivity (91%) and specificity (91%) among adolescents between the ages of 12 and 17 years.²⁹ Racial/

ethnic differences in symptoms listed on the BDI-PC were not significant in other studies, although small sample sizes in those studies may not have been adequate to fully capture differences.^{28,29} In a Spanish-speaking sample, sensitivity was 82% and specificity was 72%.³⁰ For this study, a dummy variable was created for analysis using binary logistic regression and respondents who scored ≥ 4 on the BDI-PC were assigned a 1, and respondents who scored < 4 were assigned a 0. To examine differences in level of depressive symptoms, BDI-PC score was included in the second set of analyses as a continuous variable in case a score of ≥ 4 did not indicate referral for depression in this sample and to assess whether the results are similar between the two analyses.

Trauma. The trauma questions in this survey were adapted from a questionnaire that was designed to measure life experiences of military personnel and veterans before deployment.³¹ This questionnaire was adapted by using only the portion of the questionnaire that asked about exposure to traumatic events that occurred before deployment. In addition, all references to deployment were removed from the survey. The revised questionnaire consisted of a series of 14 yes/no questions about whether the respondents had ever experienced one of the following traumas during their lifetime: (1) natural disaster, (2) combat or war zone, (3) someone close to them in combat or war zone, (4) mental illness or life-threatening illness of someone close to them, (5) parent with substance abuse issues, (6) death of someone close to them, (7) divorced or been left by a partner, (8) robbed, (9) losing their job, (10) emotional mistreatment, (11) physical fighting between caregivers, (12) physical punishment by parent or caregiver, (13) physically injured by another person, or (14) unwanted sexual activity. There were two items that asked women who reported that they were physically injured by another person or who experienced unwanted sexual activity if they had experienced those events as children. The responses to these two questions were not used in this study because they were asked only of a subsection of the women and not all the women. A count of all positive responses was used to create a trauma variable. The trauma measure exhibited moderate internal consistency (Cronbach's $\alpha = 0.77$), which could be expected, as this measure captured a general count of traumatic experiences and was not intended to measure any underlying construct.

Intimate partner violence. The four questions about IPV were developed as a brief measure for use in research studies. It was adapted from other violence screeners in the literature and included whether a respondent's partner (1) yelled at her or called her names, (2) injured her through physical force, (3) forced her to have sex, or (4) if respondent lost consciousness or visited a doctor because of a fight with their partner. Women who currently had a partner recorded how many times these incidents occurred in the past year using the following choices: this never happened or happened 1 time, 2 times, 3–5 times, 6–10 times, 11–20 times, and 20+ times. Each answer was assigned a score of 0, 1, 2, 4, 8, 15, and 25, respectively. Women who reported that they did not currently have a partner were not required to answer the IPV questions. The scores were summed for a total possible score between 0 and 100. The items for IPV in this survey do not represent an exhaustive list of all types of IPV but include items that may be

more traumatic in nature. The internal consistency of this measure was low (Cronbach's $\alpha = 0.59$), but the IPV questions were meant to be a general indicator of IPV that may have occurred in a relationship during the past year.

PTSD symptoms. PTSD symptoms were measured using a modified subscale from the Psychiatric Diagnostic Screening Questionnaire (PDSQ), which was developed to screen for symptoms of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) axis I disorders. The original version of the PDSQ subscale was intended to screen for PTSD symptoms, with a sensitivity of 92% and good reliability and validity.^{32–34}

The PTSD measure in this study included seven items that had a yes/no response, with a possible score ranging between 0 and 7. The version of the PDSQ subscale used in this survey has not been validated and is not intended to diagnose PTSD but to count some symptoms that are part of the PTSD diagnosis. If respondents answered that they had experienced a traumatic event, they were prompted to answer questions about symptoms from criteria B and C. Symptoms of criterion B in this study deal with reexperience of the trauma through thoughts, dreams, or feelings. Questions for criterion C reflect avoidance of stimuli associated with trauma, such as avoiding thoughts or activities or experiencing feelings of detachment. For this study, PTSD symptoms were included in the analyses so that the effects of IPV and trauma could be evaluated after controlling for the PTSD symptoms. These seven items had a good internal consistency (Cronbach's $\alpha = 0.90$).

Demographic variables. Other variables included in this study are marital status, education, employment status, and household income. Marital status had four possible categories: married, single, separated (including divorced and widowed), and living with partner. Education had three categories: currently enrolled or not graduated from high school, high school completed or GED earned, and some college or more. Employment status had four categories: not employed, employed part-time (1–30 hours of work each week), employed full time (worked 31–40 hours each week), and overtime (worked 41 or more hours each week). Income was categorized as household income of $< \$15,000$, between $\$15,000$ and $\$29,999$, $> \$30,000$, and missing. The missing category was necessary because a high proportion of Hispanic women did not report a household income.

Statistical analyses

SAS version 9.2 software of the SAS System for Windows XP was used to conduct all data analyses. Descriptive data comparisons were made using chi-square statistics. An analysis of variance (ANOVA) was used to compare the mean trauma scores among African American, Hispanic, and white women. ANOVA was used to determine if there were racial/ethnic differences in the scores for each item on the depression questionnaire. Binary logistic regression was used to calculate the odds of having more > 4 depressive symptoms, as measured by the BDI-PC. Poisson regression within the GENMOD procedure was used to calculate the estimated Poisson regression coefficient for the log of the expected count of depressive symptoms, using the Pearson chi-square parameter to account for overdispersion in the data. Poisson regression was used because the datum for depression was a count of

symptom severity that occurred in the past 2 weeks. The distribution of the count of BDI-PC items was characteristic of a Poisson distribution, where most respondents reported no depressive symptoms and few reported a high score. Relative risks (RR) were estimated from Poisson coefficients to improve interpretability.

Results

Descriptive statistics

Chi-square analyses indicated that there were significant differences in marital status ($p < 0.001$), household income ($p < 0.001$), education ($p < 0.001$), work status ($p < 0.001$), depressive symptoms ($p < 0.01$), and PTSD symptoms ($p < 0.01$) in young women of different racial/ethnic groups (Table 1.) More African American women reported that they were single, and more Hispanics reported that they lived with a partner or were married. More African Americans reported a household income $< \$15,000$, a higher proportion of white women reported a household income $> \$29,999$, and a high proportion of Hispanic women did not report their income. A higher proportion of Hispanic women reported that they had not yet graduated from high school or had a high school diploma, whereas African American and white women reported similar rates of college attendance. A higher proportion of Hispanics were not working, and more white women worked full-time or overtime. A higher proportion of white

women reported having experienced IPV, PTSD symptoms, or ≥ 4 symptoms of depression than did Hispanic or African American women.

The types of trauma reported by women of different racial/ethnic groups varied (Table 2). In general, a greater proportion of white women experienced each of the trauma types except direct combat. There were some differences observed between African American and Hispanic women. A higher proportion of African American women reported experiencing a natural disaster, death of someone close to them, and job loss or had been punished physically. Overall, ANOVA comparisons revealed that Hispanic women reported 0.60 fewer traumatic events than white women ($p < 0.05$). African American women reported 1.4 fewer traumatic events than white women ($p < 0.05$).

Symptoms of depression also varied somewhat by racial/ethnic groups. ANOVA revealed differences in the scores for four questions on the BDI-PC by race/ethnicity among women who reported ≥ 1 symptoms of depression. Differences were observed; African Americans reported a higher score for sadness ($F = 5.75, p = 0.002$) than white or Hispanic women, white women and Hispanic women reported higher scores for self-failure ($F = 7.83, p < 0.001$) than African American women, white women reported higher scores for self-dislike ($F = 10.59, p < 0.001$) than both African Americans and Hispanics, and white women reported higher scores for self-criticism ($F = 3.15, p = 0.04$) than African Americans.

TABLE 1. DESCRIPTIVE CHARACTERISTICS OF RESPONDENTS (N=2414)

	Total n (%)	African American n (%)	Hispanic n (%)	White n (%)	DF	Chi-square	p value
Race/ethnicity		649 (26.9)	1042 (43.2)	723 (29.9)			
Marital status							
Single	1469 (61.2)	541 (84.0)	472 (45.4)	456 (63.6)			
Living together	487 (20.3)	59 (9.2)	288 (27.7)	140 (19.5)			
Married	329 (13.7)	28 (4.3)	218 (21.0)	83 (11.6)			
Separated/ widowed/divorced	115 (4.8)	16 (2.5)	61 (5.9)	38 (5.3)	6	259.09	<0.001
Household income							
<\$15,000	1253 (51.9)	392 (60.4)	520 (49.9)	341 (47.1)			
\$15,000–\$29,999	573 (23.7)	129 (19.9)	257 (24.7)	124 (11.9)			
>\$29,999	330 (13.7)	71 (10.9)	124 (11.9)	135 (18.7)			
Missing	258 (10.7)	57 (8.8)	141 (13.5)	60 (8.3)	6	51.9	<0.001
Education							
<High school	899 (37.7)	211 (32.5)	451 (44.6)	237 (32.8)			
High school	774 (32.5)	210 (32.4)	338 (33.4)	226 (31.3)			
College	710 (29.8)	228 (35.1)	223 (22.0)	259 (35.9)	4	58.0	<0.001
Work status							
None	1311 (54.5)	329 (50.8)	636 (61.5)	346 (47.9)			
Part-time	538 (22.4)	161 (24.9)	191 (18.4)	186 (25.8)			
Full-time	453 (18.8)	128 (19.8)	171 (16.5)	154 (21.3)			
Overtime	102 (4.3)	29 (4.5)	37 (3.6)	36 (5.0)	6	36.85	<0.001
Intimate partner violence							
Reported no incidents	1315 (67.9)	329 (70.0)	599 (68.9)	387 (64.7)			
Reported ≥ 1 incidents	622 (32.1)	141 (30.0)	270 (31.1)	211 (35.3)	2	4.15	0.13
PTSD symptoms							
0	1891 (78.8)	536 (82.8)	844 (81.5)	511 (71.3)			
≥ 1	509 (21.2)	111 (17.2)	192 (18.5)	206 (28.7)	2	35.08	<0.001
Depression status							
<4 symptoms	1836 (76.1)	506 (78.0)	814 (78.1)	516 (71.4)			
≥ 4 symptoms	578 (23.9)	143 (22.0)	228 (21.9)	207 (28.6)	2	12.46	0.002

DF, degrees of freedom; PTSD, posttraumatic stress disorder.

TABLE 2. CHI-SQUARE ANALYSIS DESCRIBING TRAUMA TYPES BY RACE/ETHNICITY (N=2414)

Trauma type	Total n (%)	Black n (%)	Hispanic n (%)	White n (%)	DF	Chi-square	p value
Experienced natural disaster	1213 (50.5)	341 (52.7)	450 (43.6)	422 (58.5)	2	39.7	<0.001
Directly experienced combat	31 (1.3)	11 (1.7)	10 (1.0)	10 (1.4)	2	1.7	0.43
Close to someone in combat	323 (10.1)	65 (10.1)	105 (10.2)	153 (21.3)	2	53.4	<0.001
Close to someone with mental or physical illness	567 (23.6)	121 (18.7)	174 (16.9)	272 (37.7)	2	114.0	<0.001
Parent abused drugs or alcohol	744 (30.9)	168 (26.0)	250 (24.1)	326 (45.2)	2	98.1	<0.001
Death of someone close	1500 (62.5)	428 (66.5)	531 (51.4)	541 (74.9)	2	106.2	<0.001
Divorced or left by partner	575 (23.9)	123 (19.0)	213 (20.6)	239 (33.2)	2	48.42	<0.001
Burglarized	418 (17.4)	106 (16.4)	160 (15.4)	152 (21.1)	2	10.0	0.007
Lost job	621 (25.9)	186 (28.8)	186 (18.1)	249 (34.5)	2	63.7	<0.001
Emotional mistreatment	824 (34.3)	214 (33.1)	292 (28.2)	318 (44.0)	2	47.8	<0.001
Parents physically fought	751 (31.3)	194 (30.1)	254 (24.6)	303 (42.0)	2	60.3	<0.001
Punished physically	490 (20.5)	134 (20.8)	128 (12.4)	228 (31.7)	2	96.4	<0.001
Injured by another person	543 (22.7)	133 (20.7)	196 (19.1)	214 (29.7)	2	29.2	<0.001
Unwanted sexual activity	362 (15.53)	84 (13.5)	123 (12.2)	155 (22.1)	2	33.3	<0.001

Depression

Almost one fourth (23.9%) of women reported a score of ≥ 4 on the BDI-PC. Logistic regression was used to compare the difference in likelihood of women who reported ≥ 4 symptoms of depression to women who reported < 4 symptoms of depression. For these analyses, four models were used to describe the associations. The first model controlled for demographics and economic variables, the second model added PTSD symptoms, the third model added IPV, and the fourth model included variables from the second model and added traumatic events. African American women were 29.2% (95% confidence interval [CI] 8.6%–45.1%) less likely to report ≥ 4 symptoms of depression (Table 3) than white women. In model 2, however, PTSD symptoms reduced the difference in risk for depression between the groups, and the differences in the likelihood of reporting ≥ 4 symptoms of depression were no longer statistically significant.

Hispanics were 32.2% (95% CI 14.6%–46.2%) less likely to report ≥ 4 symptoms of depression than white women in model 1. After PTSD symptoms were controlled for, Hispanic women were 26.4% (95% CI 6.2%–42.2%) less likely than white women to report ≥ 4 depressive symptoms. Hispanic women were still 25.5% (95% CI 2.3%–43.2%) less likely than white women to report ≥ 4 depressive symptoms after IPV and PTSD symptoms were controlled for in model 3. When the total reported traumas were included in model 4, the difference in likelihood of having ≥ 4 depressive symptoms between Hispanic and white women was no longer significant.

BDI count of depressive symptoms

Poisson regression with adjustment for Pearson overdispersion revealed that African American ($p < 0.05$) and Hispanic women ($p < 0.01$) reported a lower risk of an increased count of depressive symptoms than white women in model 1 (Table 4) after controlling for age, marital status, household income, education, and work status. PTSD reduced the association between race and depressive symptoms in model 2, reducing the difference in risk of increased depressive symptoms between African American and white women ($p > 0.05$), and the difference in risk between Hispanic

and white women was reduced ($p < 0.05$) but not completely eliminated. IPV was included in model 3, but the difference in risk of reporting increased depressive symptoms between Hispanic and white women remained significant ($p < 0.05$). The fourth model included the sum of 14 traumatic events in the analysis. Trauma reduced the risk of reporting increased depressive symptoms between Hispanic women and white women ($p > 0.05$), so that the difference between these groups was no longer significant.

Discussion

There are inconsistencies in the literature that examines the differences in depression by race/ethnicity, with no racial or ethnic groups showing a consistent advantage across studies. Although this study cannot establish in a larger population whether any particular racial/ethnic group of women has a higher risk for depression, it does show that in a clinical sample of young women from low-income households, racial/ethnic differences in the level of depressive symptoms exist and that life circumstances, such as trauma and PTSD symptoms, may contribute to these differences. This research also illustrates that depression among young women is complicated and there may be nonbiologic factors that affect racial/ethnic differences in depressive symptoms. It may not be adequate to assess only depression, especially among women, in a clinical setting. Other risk factors, such as trauma, IPV, and PTSD, should also be assessed when determining whether to refer the patient for mental healthcare. Assessing all these variables can help healthcare providers better understand their patients' mental health needs and devise better treatment modalities.

The overall rate of depression in this study was comparable to that in other studies; 24% of the women in this sample had ≥ 4 depressive symptoms, which is consistent with the 20%–25% of young women in other clinical and community-based surveys who reported moderate to severe depression.^{11,35} In this study, a higher proportion of white women reported ≥ 4 depressive symptoms, at 29%, compared to 23% of Hispanic and 22% of African American women. This finding is in agreement with a nationally representative study of Hispanic and African American men and women who demonstrated

TABLE 3. BINARY LOGISTIC REGRESSION OF EFFECT OF POSTTRAUMATIC STRESS DISORDER SYMPTOMS, INTIMATE PARTNER VIOLENCE, AND LIFETIME TRAUMA ON ASSOCIATION BETWEEN RACE/ETHNICITY AND AT-RISK FOR DEPRESSION STATUS (≥4 SYMPTOMS) AMONG YOUNG WOMEN (N=2414)

Demographics	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Age ^a	0.965 (0.921-1.011)	0.976 (0.930-1.025)	0.985 (0.934-1.040)	0.970 (0.923-1.020)
Race/ethnicity				
African American ^b	0.708 (0.549-0.914)	0.798 (0.611-1.042)	0.855 (0.628-1.166)	0.968 (0.734-1.275)
Hispanic ^b	0.678 (0.538-0.854)	0.736 (0.578-0.938)	0.745 (0.568-0.977)	0.963 (0.747-1.241)
Marital status				
Single ^c	1.202 (0.860-1.679)	1.110 (0.785-1.570)	1.072 (0.743-1.547)	1.014 (0.714-1.439)
Living together ^c	1.450 (1.017-2.069)	1.370 (0.947-1.982)	1.379 (0.946-2.010)	1.269 (0.873-1.844)
Separated/widowed/divorced ^c	2.965 (1.844-4.767)	2.645 (1.617-4.328)	2.198 (1.234-3.916)	2.043 (1.234-3.381)
Household income				
<\$15,000 ^d	1.029 (0.739-1.434)	0.946 (0.670-1.336)	1.233 (0.858-1.772)	1.080 (0.789-1.479)
\$15,000-\$29,999 ^d	1.174 (0.871-1.581)	1.076 (0.789-1.466)	1.122 (0.752-1.675)	0.931 (0.656-1.320)
Missing ^d	1.094 (0.734-1.632)	1.152 (0.762-1.740)	1.092 (0.667-1.790)	1.236 (0.814-1.878)
Education				
<High school ^e	1.205 (0.913-1.590)	1.261 (0.945-1.683)	1.263 (0.917-1.738)	1.370 (1.020-1.840)
High school ^e	0.983 (0.762-1.269)	0.958 (0.734-1.251)	0.926 (0.686-1.250)	1.015 (0.775-1.331)
Work status				
None ^f	1.158 (0.881-1.523)	1.152 (0.866-1.533)	1.200 (0.869-1.658)	1.153 (0.864-1.537)
Part-time ^f	0.951 (0.696-1.298)	1.034 (0.747-1.430)	1.020 (0.704-1.478)	1.050 (0.756-1.458)
Overtime ^f	1.889 (1.163-3.067)	1.803 (1.087-2.991)	1.934 (1.098-3.407)	1.752 (1.044-2.941)
PTSD				
PTSD symptoms ^a		1.333 (1.273-1.396)	1.267 (1.201-1.337)	1.222 (1.162-1.286)
IPV				
Violence from partner ^a			1.038 (1.025-1.051)	
Trauma event				
Combined traumas ^a				1.174 (1.130-1.221)

^aIncluded in model as continuous variable.
^bWhite women as comparison category.
^cMarried women as comparison category.
^dHousehold income >\$29,999 as comparison category.
^eCollege as comparison category.
^fWork 35-40 hours/week (full-time) as comparison category.
 CI, confidence interval; IPV, intimate partner violence; OR, odds ratio.

a lower risk of psychiatric disorders than white women.^{6,7} However, one other study that used a longer version of the BDI-PC, the Beck Depression Inventory (BDI), among women in a similar study to detect depressive symptoms did not find significant differences in depression by race/ethnicity.¹¹

We observed increased reports of IPV, trauma, and PTSD symptoms among white women compared to Hispanic and African American women. This finding is consistent with a study that was also conducted in a clinical setting, where white and African American women had elevated levels of IPV.³⁶ Our results for IPV however, are in contrast to the findings from the Behavioral Risk Factor Surveillance Study (BRFSS), which found that IPV did not vary by race after accounting for age, marital status, and income.³⁷ Our results also could have been affected by the high proportion of women who reported that they did not have a partner and did not respond to the IPV questions. Those women may have experienced IPV in the past, which could have affected their level of depressive symptoms at the time of the survey, as it has been found that IPV contributes to higher levels of depressive symptoms across time.³⁸

In the trauma literature, violent trauma has been shown to be more common among minorities than nonminorities.^{39,40} There was some evidence to the contrary, also. A nationally representative study found that African American and His-

panic men and women were at lower risk of experiencing most types of trauma compared to whites, with the exception of child maltreatment and assaultive violence.⁴¹ Compared to white females, African Americans were similar in trauma exposure and PTSD development in a study of female veterans who visited a primary care facility, with the exception of increased exposure to physical assault and sexual abuse in childhood among white women.⁴²

In our study, the presence of PTSD symptoms reduced the difference in depressive symptoms between white and African American women, and trauma reduced the differences in depressive symptoms between Hispanic and white women after controlling for PTSD symptoms. IPV did not significantly affect the differences in depressive symptoms between racial/ethnic groups. There is abundant research that documents the short-term and long-term effects of IPV, trauma, and PTSD on depression among many diverse groups of men and women. However, this study directly examined whether PTSD symptoms, IPV, and trauma affected racial/ethnic differences in depression in a clinical sample. This is important information because it indicates that there is a high prevalence of depression in the communities where women are accessing publicly funded reproductive healthcare and that elevated levels of depressive symptoms among white women in these communities may be due to higher levels of traumatic events,

TABLE 4. POISSON REGRESSION MODELING THE EFFECTS OF POSTTRAUMATIC STRESS DISORDER SYMPTOMS, IPV, AND TRAUMA EVENTS ON THE ASSOCIATION BETWEEN RACE/ETHNICITY AND BECK DEPRESSION INVENTORY DEPRESSIVE SYMPTOMS (N=2414)

Demographics	Model 1		Model 2		Model 3		Model 4	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
Age ^a	0.997	(0.967-1.027)	1.010	(0.979-1.037)	1.016	(0.984-1.048)	1.003	(0.975-1.032)
Race/ethnicity								
Black ^b	0.837	(0.715-0.980)	0.922	(0.793-1.071)	0.954	(0.802-1.137)	1.035	(0.888-1.206)
Hispanic ^b	0.797	(0.690-0.920)	0.864	(0.753-0.991)	0.831	(0.716-0.964)	1.018	(0.882-1.175)
Marital status								
Single ^c	1.150	(0.928-1.425)	1.083	(0.880-1.332)	1.045	(0.846-1.292)	1.015	(0.828-1.243)
Living together ^c	1.340	(1.071-1.675)	1.289	(1.037-1.602)	1.281	(1.033-1.589)	1.216	(0.980-1.509)
Seperated/widowed/divorced ^c	2.096	(1.587-2.769)	1.873	(1.424-2.465)	1.693	(1.237-2.316)	1.551	(1.180-2.038)
Household income								
<\$15,000 ^d	1.177	(0.979-1.415)	1.084	(0.912-1.288)	1.192	(0.979-1.450)	1.072	(0.904-1.274)
\$15,000-\$29,999 ^d	1.086	(0.886-1.332)	1.020	(0.840-1.239)	1.135	(0.914-1.410)	1.003	(0.828-1.215)
Missing ^d	1.022	(0.793-1.317)	1.041	(0.816-1.329)	1.046	(0.791-1.384)	1.086	(0.851-1.385)
Education								
<High school ^e	1.112	(0.940-1.316)	1.152	(0.987-1.346)	1.131	(0.955-1.339)	1.195	(1.024-1.394)
High school ^e	0.963	(0.820-1.131)	0.952	(0.818-1.109)	0.949	(0.803-1.122)	0.986	(0.849-1.146)
Work status								
None ^f	1.394	(1.055-1.841)	1.129	(0.935-1.364)	1.376	(1.037-1.826)	1.256	(0.959-1.645)
Part-time ^f	1.067	(0.876-1.300)	1.322	(1.008-1.733)	1.152	(0.931-1.426)	1.121	(0.930-1.352)
Overtime (>40 hours) ^f	1.239	(1.046-1.468)	1.226	(1.048-1.435)	1.303	(1.091-1.555)	1.209	(1.037-1.410)
PTSD								
PTSD symptoms ^a			1.193	(1.167-1.219)	1.160	(1.130-1.191)	1.126	(1.097-1.156)
IPV								
Violence from partner ^a					1.014	(1.009-1.020)		
Trauma event								
Combined traumas ^a							1.100	(1.077-1.123)

^aIncluded in model as continuous variable.

^bWhite women as comparison category.

^cMarried women as comparison category.

^dHousehold income >\$29,999 as comparison category.

^eCollege as comparison category.

^fWork 35-40 hours/ week (full-time) as comparison category.

RR, relative risk.

IPV, and PTSD symptoms. It is unclear why white women in our study reported more trauma, IPV, and PTSD symptoms than African American or Hispanic women. The way that trauma, IPV, and PTSD were measured may have been the source of some differences. It is possible, however, that community characteristics play a role, or there may be other factors that prevent depressed African American and Hispanic women from using the services of the clinics where the questionnaire was administered.

Although the methodologies to measure IPV, PTSD, and trauma varied and likely contributed to differences between studies, these differences could also indicate that life circumstances occur in clusters. These clusters may be especially apparent when measured at the community level and could be influenced by cultural, socioeconomic, or educational factors. It is known that economic vulnerability, community character, and levels of education may affect IPV, child abuse, and homicide within a community.¹⁴⁻¹⁶ These circumstances may then contribute to increased mental health issues within at-risk communities, including PTSD and depression.

Some symptoms that were measured by the BDI-PC differed among white, African American, and Hispanic women. White women reported greater dislike for themselves and

higher self-criticism than women from other racial/ethnic backgrounds, results that are similar to those of another study that found that white adolescent females with MDD report more feelings of worthlessness than other adolescents with MDD.⁵ It is possible that a traumatic past and PTSD symptoms may be more likely to cause white women to feel higher levels of dislike for themselves and more self-criticism, which could help to explain why PTSD symptoms and trauma reduced racial/ethnic differences in depressive symptoms among white, African American, and Hispanic women.

This study has some limitations. This sample is not generally representative of a population of young low-income women and cannot determine causality as a cross-sectional study. However, it does offer insight into some possible reasons for racial/ethnic differences in depression among women as well as direction for future studies. Further, this study used a PTSD measure that could not diagnose PTSD and did not include symptoms for criterion D or symptoms of hyper-arousal as required for diagnosis of PTSD by the DSM IV. However, it offers insights into whether PTSD symptoms account for some differences in depressive symptoms among young, low-income African

American, Hispanic, and white women in a diverse clinical sample.

The questions that were included in the trauma questionnaire and the IPV questionnaire may have introduced bias into the study. The trauma questionnaire was developed for a military population, and the changes that were made may have lowered the validity of the measure in our population. Further, the IPV measure was limited to women who had been in a relationship in the past year and has not been validated.

It must also be noted that events after Hurricane Ike in the communities assessed in this study could have influenced the outcomes. The BDI-PC was administered during a period of economic recession after Hurricane Ike, an event that affected many of the communities where the clinics were located. It is possible that employed white women were disproportionately affected by Ike and visited the clinics after losing employment, when related depression and memories of the traumatic experience would be at their peak. More white women reported that they had lost a job, and this could have been as a result of the poor economic conditions in their communities after the devastation of Hurricane Ike.

Another possible reason for the differences in the focal variables in this study is that low-income African American and Hispanic women who experience trauma and PTSD-related depression may not use publicly funded family planning clinics at the same rate as white women. If so, these results may have important implications for the communities where the clinics are located. Depression increases the likelihood of becoming pregnant at a younger age, having a poor birth outcome, and contracting a sexually transmitted infection; therefore, depression is relevant to reproductive healthcare.⁴³ To reduce disparities in reproductive and mental healthcare in these communities, mental health programs may need to target these populations. In addition, this study shows that routine screening for depression, trauma, IPV, and PTSD would be a positive addition to family planning clinics that focus on providing reproductive health services to low-income women.

Conclusions

This study suggests that PTSD and trauma may affect racial/ethnic variations in depressive symptoms in a clinical sample of young women from low-income households. Clinicians, especially those serving women from low-income households, should be aware of the high rates of women who are at risk of depression among their patients and that these high rates may be influenced by trauma, PTSD, and IPV. Future research should consider including IPV, PTSD, and evaluations of traumatic events when assessing whether there are racial/ethnic differences in depression among women. Future research using longitudinal data from a nationally representative data source would help to establish temporal relationships and to determine if IPV, PTSD, and traumatic events affect racial/ethnic variations in depression in a more representative sample.

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References

1. Hasin DS, Goodwin RD, Stinson FS, Grant BF. Epidemiology of major depressive disorder. *Arch Gen Psychiatry* 2005;62:1097–1106.
2. Burt VK, Stein K. Epidemiology of depression throughout the female life cycle. *J Clin Psychiatry* 2002;63:9–15.
3. González HM, Tarraf W, Whitfield KE, Vega WA. The epidemiology of major depression and ethnicity in the United States. *J Psychiatr Res* 2010;44:1043–1051.
4. Adkins DE, Wang V, Elder GH. Structure and stress: Trajectories of depressive symptoms across adolescence and young adulthood. *Soc Forces* 2009;88:1–31.
5. Rohde P, Beevers CG, Stice E, O'Neil K. Major and minor depression in female adolescents: Onset, course, symptom presentation, and demographic associations. *J Clin Psychol* 2009;65:1339–1349.
6. Breslau J, Aguilar-Gaxiola S, Kendler KS, et al. Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. *Psychol Med* 2006;36:57–68.
7. Breslau J, Kendler KS, Su M, Gaxiola-Aguilar S, Kessler RC. Lifetime risk and persistence of psychiatric disorders across ethnic groups in the United States. *Psychol Med* 2005;35:317–327.
8. Reeves WC, Strine TW, Pratt LA, et al. Mental illness surveillance among adults in the United States. *MMWR* 2011;60:1–30.
9. Jorde LB, Wooding SP. Genetic variation, classification and 'race.' *Nat Genet* 2004;36:S28–S33.
10. Witzig R. The medicalization of race: Scientific legitimization of a flawed social construct. *Ann Intern Med* 1996;125:675–679.
11. Rickert VI, Wiemann CM, Berenson AB. Ethnic differences in depressive symptomatology among young women. *Obstet Gynecol* 2000;95:55–60.
12. Bonomi AE, Anderson ML, Reid RJ, et al. Medical and psychosocial diagnoses in women with a history of intimate partner violence. *Arch Intern Med* 2009;169:1692–1697.
13. Breslau N, Davis GC, Peterson EL, Schultz LR. A second look at comorbidity in victims of trauma: The posttraumatic stress disorder-major depression connection. *Biol Psychiatry* 2000;48:902–909.
14. Fox GL, Benson ML. Household and neighborhood contexts of intimate partner violence. *Public Health Rep* 2006;121:419–427.
15. Coulton CJ, Crampton DS, Irwin M, Spilsbury JC, Korbin JE. How neighborhoods influence child maltreatment: A review of the literature and alternative pathways. *Child Abuse Neglect* 2007;31:1117–1142.
16. Jones-Webb R, Wall M. Neighborhood racial/ethnic concentration, social disadvantage, and homicide risk: An ecological analysis of 10 U.S. cities. *J Urban Health* 2008;85:662–676.

17. Campbell JC. Health consequences of intimate partner violence. *Lancet* 2002;359:1331-1336.
18. Resnick HS, Kilpatrick DG, Dansky BS, Saunders BE, Best CL. Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *J Consult Clin Psychol* 1993;61:984-991.
19. Zinzow HM, Resnick H, McCauley JL, et al. Prevalence and risk of psychiatric disorders as a function of variant rape histories: Results from a national survey of women. *Soc Psychiatry Psychiatr Epidemiol* 2011;Online:1-10.
20. Zinzow HM, Rheingold AA, Hawkins A, Saunders BE, Kilpatrick DG. Losing a loved one to homicide: Prevalence and mental health correlates in a national sample of young adults. *J Traumatic Stress* 2009;22:20-27.
21. Alim TN, Graves E, Mellman TA, et al. Trauma exposure, posttraumatic stress disorder and depression in an African-American primary care population. *J Natl Med Assoc* 2006;98:1630-1636.
22. American Psychiatric Association. Diagnostic and statistical manual of mental disorders IV, 4th ed. Washington, DC: American Psychiatric Association, 2002.
23. Oquendo M, Brent DA, Birmaher B, et al. Posttraumatic stress disorder comorbid with major depression: Factors mediating the association with suicidal behavior. *Am J Psychiatry* 2005;162:560-566.
24. Shalev AY, Freedman S, Peri T, et al. Prospective study of posttraumatic stress disorder and depression following trauma. *Am J Psychiatry* 1998;155:630-637.
25. Golding JM. Intimate partner violence as a risk factor for mental disorders: A meta-analysis. *J Fam Violence* 1999;14:99-132.
26. Freedy JR, Magruder KM, Zoller JS, et al. Traumatic events and mental health in civilian primary care: Implications for training and practice. *Clin Res Methods* 2010;42:185-192.
27. Steer RA, Cavalieri TA, Leonard DM, Beck AT. Use of the Beck Depression Inventory for primary care to screen for major depression disorders. *Gen Hosp Psychiatry* 1999; 21:106-111.
28. Beck AT, Guth D, Steer RA, Ball R. Screening for major depression disorders in medical inpatients with the Beck Depression Inventory for Primary Care. *Behav Res Ther* 1997;35:785-791.
29. Winter LB, Steer RA, Jones-Hicks L, Beck AT. Screening for major depression disorders in adolescent medical outpatients with the Beck Depression Inventory for Primary Care. *J Adolesc Health* 1999;24:389-394.
30. Orive M, Padierna JA, Quintana JM, et al. Detecting depression in medically ill patients: Comparative accuracy of four screening questionnaires and physicians' diagnoses in Spanish population. *J Psychosom Res* 2010;69:399-406.
31. King LA, King DW, Vogt DS, Knight J, Samper RE. Deployment risk and resilience inventory: A collection of measures for studying deployment-related experiences of military personnel and veterans. *Milit Psychol* 2006;18:89-120.
32. Gibbons RD, Rush AJ, Immekus JC. On the psychometric validity of the domains of the PDSQ: An illustration of the Bi-Factor Response Theory Model. *J Psychiatr Res* 2009; 43:401-410.
33. Zimmerman M, Mattia JI. A self-report scale to help make psychiatric diagnoses: The Psychiatric Diagnostic Screening Questionnaire. *Arch Gen Psychiatry* 2001;58:787-794.
34. Zimmerman M, Mattia JI. The Psychiatric Diagnostic Screening Questionnaire: Development, reliability and validity. *Compr Psychiatry* 2001;42:175-189.
35. Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication. *JAMA* 2003;289:3095-3105.
36. McFarlane JM, Groff JY, O'Brien JA, Watson K. Prevalence of partner violence against 7,443 African American, white, and Hispanic women receiving care at urban public primary care clinics. *Public Health Nurs* 2005;22:98-107.
37. Vest JR, Catlin TK, Chen JJ, Brownson RC. Multistate analysis of factors associated with intimate partner violence. *Am J Prev Med* 2002;22:156-164.
38. La Flair LN, Bradshaw CP, Campbell J. Intimate partner violence/abuse and depressive symptoms among female health care workers: Longitudinal findings. *Womens Health Issues* 2012;20:295-301.
39. Breslau N, Kessler RC, Chilcoat HD, et al. Trauma and posttraumatic stress disorder in the community: The 1996 Detroit Area Survey of Trauma. *Arch Gen Psychiatry* 1998; 55:626-632.
40. Turner RJ, Lloyd DA. Stress burden and the lifetime incidence of psychiatric disorder in young adults. *Arch Gen Psychiatry* 2004;61:481-488.
41. Roberts AL, Gilman SE, Breslau J, Breslau N, Koenen KC. Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychol Med* 2011;41:71-83.
42. Grubaugh AL, Slagle DM, Long M, Frueh BC, Magruder KM. Racial disparities in trauma exposure, psychiatric symptoms, and service use among female patients in Veterans Affairs primary care clinics. *Womens Health Issues* 2008;18:433-441.
43. Berenson AB, Radecki-Breitkopf C, Wu ZH. Reproductive correlates of depressive symptoms among low-income minority women. *Obstet Gynecol* 2003;102:1310-1317.

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