How Depressive Symptoms among African American Women Relate to Measures of Social Disorder in Her Childhood and Pregnancy Neighborhood

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Abstract Pregnant African American women who report higher levels of social disorder (e.g., vacant housing, drug dealing) in their neighborhoods also report higher levels of depressive symptoms. The effects of social disorder in the neighborhood during childhood on depressive symptoms during pregnancy are not known. Also unknown is the interaction between social disorders in the neighborhood during childhood and during pregnancy regarding depressive symptoms during pregnancy. The purpose of this study was to examine whether higher levels of social disorder in the neighborhood during pregnancy buffered the association of social disorder in the neighborhood during childhood (at age 10 as reference) with depressive symptoms during pregnancy among African American women. We conducted

a secondary data analysis of 1383 African American women from the Life-course Influences on Fetal Environments (LIFE) Study (Detroit, Michigan, 2009–2011). Women were interviewed in the hospital 24–72 h after the births. The Center for Epidemiological Studies-Depression (CES-D) scale measured depressive symptoms. Scales measuring social disorder in the neighborhood both during childhood and during pregnancy were also included in the interviews. Women with CES-D scores ≥ 16 were younger, were more likely to be single, and had lower levels of education and household income compared with women with CES-D < 16 . There was a significant association between women who report social disorder in their neighborhoods during childhood and depressive symptoms during pregnancy. This effect was moderated by measures of social disorder in the neighborhood during pregnancy ($p = .037$). Women who reported both low levels of social disorder in their neighborhoods during childhood and during pregnancy had the lowest CES-D scores after controlling for maternal age, marital status, years of education, and family income. The model had a good fit to the data ($\chi^2_{(6)} = 6.36, p = .38$). Health care providers should inquire about neighborhood conditions during childhood and during pregnancy and provide referrals for appropriate professional and community support for women who report social disorder in their neighborhoods and depressive symptoms.

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Introduction

Approximately 12% of women worldwide experience perinatal depression—major or minor depressive symptoms experienced during pregnancy or 12 months postpartum [1, 2]. In the USA, 9% of pregnant women and 10% of postpartum women experience major depressive symptoms [3]. The prevalence of perinatal depression is higher for minority and low-income women [4, 5]. Specifically, pregnant African American women are more likely to experience higher levels of depressive symptoms compared with White women [6, 7]. Research suggests that 25–50% of African American women experience depressive symptoms during their pregnancies [8, 9]. Depressive symptoms during pregnancy have been related to negative birth outcomes (preterm birth [< 37 completed weeks gestation], low birth weight infants [< 2500 g]), impaired maternal-infant bonding, poor infant language and cognitive development, maternal hospitalization, and suicide [10–12].

Pregnant African American women are also more likely to live in neighborhoods with higher levels of social disorder compared with pregnant non-Hispanic White women [13–16]. Social disorder in the neighborhood refers to the physical environment (e.g., vacant housing, litter, and graffiti) and visible cues that indicate a lack of order and social control (e.g., drinking, yelling, drug dealing) [17, 18]. Social disorder in the neighborhood has been related to depressive symptoms among pregnant African American women. For example, Giurgescu et al. [9] found that poor neighborhood conditions (e.g., vacant houses, litter, vandalism) were related to depressive symptoms in a sample of 1383 African American women recruited during the immediate postpartum period. Similarly, measures of social disorder (e.g., gangs, drug dealing, vacant houses, vacant lots) in the neighborhood during pregnancy were related to psychological distress in a sample of 72 postpartum African American women [19]. In another sample of 95 pregnant African American women, those who reported higher levels of social disorder in their neighborhoods also reported higher levels of psychological distress [9]. In a cohort of 723 pregnant African American women, measures of social disorder in their neighborhoods were associated with depressive symptoms [20]. These results suggest that measures of social disorder in the neighborhood during pregnancy are related to depressive symptoms and psychological distress among African American women.

Among non-pregnant populations, recent research suggests that social disorder in the neighborhood

during childhood is related to depressive symptoms later in life. For example, social disorder in the neighborhood at ages 11–18 increased the risk of depressive symptoms in adolescence and into adulthood [21]. Particularly relevant to our study is research suggesting that adult (current) neighborhood conditions may influence the association between trauma during childhood and depressive symptoms during adulthood. Lowe et al. [22] showed a significant interaction between childhood trauma and current neighborhood-level crime on major depressive symptoms in a sample of 3192 adult participants. However, researchers have not examined the relationship between social disorder in the neighborhood during childhood and depressive symptoms during pregnancy.

The purpose of this study was to examine whether measures of social disorder in the neighborhood during pregnancy buffered the association of measures of social disorder in the neighborhood during childhood (at age 10 as reference) with depressive symptoms during pregnancy among African American women. The study was guided by Shonkoff's ecobiodevelopmental (EBD) model of human disease [23]. The theory posits that early experiences and environmental influences can affect brain architecture and long-term physical and mental health across the life span [23]. The model depicts intersecting relationships between biology (physical adaptations and disruptions), ecology (social and physical environments), and health (behavior and physical and mental well-being) centered on the individual. Variables were selected based on the EBD model. The conceptual variables included neighborhood environment (ecology), depressive symptoms (health), and the associated negative birth outcomes and long-term maternal and infant outcomes as a result of physical (biologic) disruptions related to depressive symptoms. The study was designed to examine the interconnecting relationships among the early neighborhood environment (measures of social disorder in the neighborhood at age 10), neighborhood environment during pregnancy, and depressive symptoms during pregnancy among African American women. We hypothesized that low levels of social disorder in the neighborhood during pregnancy buffer the effects of high levels of social disorder in the neighborhood during childhood on depressive symptoms during pregnancy.

Methods

Sample

This is a secondary analysis of Life-course Influences on Fetal Environments (LIFE) Study cohort of 1411 African American women [24, 25]. Women were recruited from the postpartum unit of a suburban Detroit hospital. Women were included in the study if they were African American, were 18–45 years old, and gave birth to a singleton baby. Women were excluded from the study if they did not speak English, had serious cognitive deficits, or were incarcerated. Seventy-one percent of women approached agreed to participate. The final sample for analysis included 1383 women who had complete data for the Center for Epidemiological Studies-Depression (CES-D) instrument.

Measures

Maternal Characteristics

Sociodemographic characteristics including age, years of education, family income, and marital status were collected by self-report. Obstetrical and medical history was abstracted from the medical records by the research staff.

Social Disorder in the Neighborhood

We used two similar scales to assess social disorder in the neighborhood. The scale used to measure social disorder in the neighborhood during pregnancy included 8 items (e.g., *How much of a problem are (or were) vacant or deserted houses or storefronts?; How much of a problem is (or was) litter, broken glass, or trash on the sidewalks and streets?*) on a 3-point scale (1 = *a big problem*, 2 = *somewhat of a problem*, or 3 = *not a problem*). The scale measuring social disorder in the neighborhood during childhood utilized six of the eight items used to assess social disorder in the neighborhood during pregnancy. Women were asked to recall conditions in their neighborhood using age 10 as a reference. Total scores ranged from 8 to 24 for social disorder in the neighborhood during pregnancy and from 6 to 18 for social disorder in the neighborhood during childhood. Scale totals were reversed so that higher scores indicate a greater amount of social disorder in the neighborhood. For some analyses, each scale was divided by the number of items so the score range on each scale reflected the score range of the items (1 to 3). This coding of the social disorder in the neighborhood scale will be referred to

as *item-averaged scoring*. These item-averaged scores were also reverse coded so that higher scores reflected greater amounts of social disorder in the neighborhood. Internal consistency reliability for this study was good (Cronbach's $\alpha = 0.93$ for both social disorder in the neighborhood during pregnancy and social disorder in the neighborhood during childhood).

Depressive Symptoms

Depressive symptoms were measured by the CES-D scale, a self-report scale for use in the general population [26, 27]. The CES-D screens for depressive symptoms within the past 7 days. CES-D is a 20-item (e.g., *I felt depressed, I had crying spells*), 4-point Likert scale (0 = *rarely or none of the time* to 3 = *most or all of the time*) with scores ranging from 0 to 60. A higher score indicates the presence of more depressive symptoms. CES-D scores of ≥ 16 reflect individuals with clinically relevant depressive symptoms [28]. The dichotomous scoring provides readily interpretable group means and frequency distributions of participant characteristics. While this cut-point is useful clinically, it is also widely recommended that continuous CES-D scores be used in multivariable regression models [29]. CES-D was reliable in studies with African American women [20, 24, 25, 30, 31]. In the current study, Cronbach's α was 0.85.

Procedures

The institutional review boards at the university and hospital sites approved the study. Women completed an informed consent process prior to data collection. Trained staff conducted postpartum interviews with the women including depressive symptoms and their perceptions of social disorder in their neighborhoods during childhood and during pregnancy. Data were collected between 24 and 72 h after birth. Women received \$50 store gift cards for their participation. Obstetrical and medical history was collected by the research staff from the medical records.

Data Management and Analysis

Data were entered and cleaned using SPSS 25 (IBM, Inc., Armonk, NY). Variable distributions were examined using univariate and multivariable statistics. Cases with missing data on CES-D were omitted, leaving 1383 cases for analysis. Maximum likelihood imputation was used to

estimate missing values on other variables. The imputation algorithm assumed a normal error distribution [32]. Prior to imputation, household income had 11% missing; no other variables had more than 4% missing.

We used independent-sample *t* tests for continuous variables and chi-square tests for ordinal variables to examine differences in sample characteristics between women with CES-D scores < 16 and women with CES-D scores ≥ 16 . We examined the stability and change in perceived social disorder in the neighborhood using the item-averaged scores and item-averaged difference scores.

To examine the potential moderating role of social disorder in the neighborhood during pregnancy on CES-D scores, the social disorder in the neighborhood during pregnancy variable was initially grouped by percentiles into high, medium, and low categories and then regrouped into high (scores ≥ 14 , top 28%) and low (scores < 14, bottom 72%) because the regression of CES-D scores on social disorder in the neighborhood during pregnancy did not differ between the low and medium categories. Multigroup structural equation modeling (MG-SEM) was used to test for differences in the regression of CES-D scores on social disorder in the neighborhood during childhood for two levels of social disorder in the neighborhood during pregnancy (high vs. low). Linearity assumptions were checked using nonparametric regression (locally estimated scatterplot smoothing, LOESS). Other details of this analysis are described in the “Results” section. Finally, measures of risk and attributable risk were computed.

Results

Sample Characteristics

Women in our study had a mean age of 27 ± 6.2 years. The majority of women had high school degree or higher education ($n = 1242$; 89.8%), were married or cohabiting ($n = 745$; 53.9%), and had an annual household income of \$30,000 or more ($n = 739$; 53.4%). Forty-two percent of women ($n = 580$) had CES-D scores ≥ 16 , which have been correlated with clinically relevant depression [28]. Women with CES-D scores ≥ 16 were younger, were more likely to be single, and had lower levels of education and household income compared with women with CES-D < 16 (see Table 1).

Table 1 Maternal sociodemographic characteristics by CES-D scores ($N = 1383$)

Variable	CES-D scores < 16 ($N = 803$), N (%)	CES-D scores ≥ 16 ($N = 580$), N (%)	<i>p</i>
Age (years)			
18–19	53 (6.6)	64 (11)	.014
20–34	624 (77.7)	431 (74.3)	
35–45	126 (15.7)	85 (14.7)	
Education (years)			
< 12	63 (7.8)	78 (13.4)	< .001
12	168 (20.9)	134 (23.1)	
13–16	456 (56.8)	328 (56.6)	
> 16	116 (14.4)	40 (6.9)	
Marital status			
Married or has partner	457 (56.9)	288 (49.7)	.008
Single	346 (43.1)	292 (50.3)	
Family income			
$\leq \$14,999$	139 (17.3)	134 (23.1)	.004
\$15,000–29,000	200 (24.9)	171 (29.5)	
\$30,000–44,999	178 (22.2)	109 (18.8)	
\$45,000–59,999	107 (13.3)	67 (11.6)	
$\geq \$60,000$	179 (22.3)	99 (17.1)	

CES-D Center for Epidemiological Studies-Depression

Mean Level of Social Disorder in the Neighborhood during Childhood and during Pregnancy

Using the item-averaged scoring, women had a mean score of social disorder in the neighborhood during childhood of 1.52 ($SD = 0.61$) and a mean score of social disorder in the neighborhood during pregnancy of 1.46 ($SD = 0.57$). This difference was significant ($t_{(1383)} = 2.77$, $p = .006$), but with a small effect size = .074 SD , indicating a slight reduction in the perception of social disorder. Note that these mean scores are approximately midway between “Not a problem” (= 1) and “Somewhat of a problem” (= 2). Thus, women on average perceived low levels of social disorder in their neighborhoods during childhood and during pregnancy.

Intra-individual Change in Social Disorder in the Neighborhood from Childhood to Assessment during Pregnancy

The correlation between social disorder in the neighborhood during childhood and social disorder in the neighborhood during pregnancy was positive but surprisingly

small ($r = .10$, $p < .001$). This reflected substantial intra-individual variability in participants' perceptions of their neighborhoods. Difference scores were computed to determine the number of participants who changed scores in either direction. Forty-three percent of women had worse scores, 40.3% had increased scores, and only 16.7% had no change in their scores. Thus, while, on average, perceptions of social disorder in the neighborhood did not change much, there was a substantial change in individuals over time.

Social Disorder in the Neighborhood and CES-D Scores

Both measures of social disorder in the neighborhood during childhood and during pregnancy were positively correlated with CES-D scores during pregnancy with correlations of 0.07 and 0.17, respectively ($p < .05$). The mean CES-D score for women with high levels of social disorder in their neighborhoods during pregnancy (scores ≥ 14) was 3.26 points higher compared with women with low levels of social disorder in their neighborhoods during pregnancy (scores < 14); CES-D scores were 17.25 and 13.99, respectively ($F_{(1381)} = 20.825$, $p < .001$). This association between CES-D scores and social disorder in the neighborhood during pregnancy corresponds to a standardized effect size (Cohen's d) of .34. Using the CES-D clinical scoring, the risk difference comparing high social disorder to low social disorder was .11 ($= .50-.39$) and the attributed risk percent (AR%) was 22.6%.

Buffering Effects of Social Disorder in the Neighborhood during Pregnancy

Description of Model

Buffering was tested using MG-SEM. A structural model was estimated in which CES-D was regressed on social disorder in the neighborhood during childhood and four covariates—maternal age, household income, level of education, and marital status. Each covariate was allowed to covary with social disorder in the neighborhood during childhood and to directly affect CES-D scores. Thus, the direct effect of social disorder in the neighborhood during childhood on CES-D scores was adjusted for maternal age, household income, level of education, and marital status.

Estimation and Testing

The regression model was simultaneously estimated in two groups defined by their level of social disorder during pregnancy with the social disorder in the neighborhood during pregnancy < 14 defining the low group. Parameters were estimated using full information maximum likelihood (SPSS AMOS 25.0) [33]. This method was used after verifying that the distributional assumptions were met for univariate and multivariable statistics (skewness < 2.0 , kurtosis < 7.0 , and Mardia's coefficient < 5.0) [34, 35]. Model testing was conducted in four steps. In step 1, a constrained model was estimated in which the outcome (CES-D) was regressed on social disorder in the neighborhood during childhood and four covariates. In this model, all regression paths were constrained to be equal across groups; the intercept and the variance-covariance terms were not constrained. In step 2, the same model was estimated but with the regression path for social disorder in the neighborhood during childhood freed to vary between groups. In step 3, the chi-square difference between these two models was tested. This was significant ($p = .037$), indicating that the regression slope differed across groups (see Table 2). The model was also tested without covariates, and regression slope estimates were similar and the test of the interaction was still significant. In the final step, paths that were not significant in both models were trimmed.

The Fitted Model

The final multigroup model is shown in Fig. 1. In the group defined by low social disorder in the neighborhood during pregnancy (scores < 14), higher levels of social disorder in the neighborhood during childhood were associated with higher CES-D scores during pregnancy (standardized path coefficient = .08). However, there was no such effect in women who reported high social disorder in the neighborhood during pregnancy (scores ≥ 14). In this group, higher levels of social disorder in the neighborhood during childhood tended to go with lower CES-D scores. This effect (standardized path coefficient = $-.05$) was not significant ($p = .36$). The covariance adjustment models were similar in both groups. Being married/cohabiting and having more years of education were associated with lower CES-D scores.

Table 2 Structural equation model test for moderated regression using nested model comparison

SEM models compared	χ^2	<i>df</i>	<i>p</i>	RMSEA	CFI	Std. RMR
Constrained model	10.69	7	.15	.02	0.99	.008
Alternative model	6.36	6	.38	.01	1.00	.005
Difference in fit	4.33	1	.037			

Using predicted scores from the final model, we see that the beneficial effects of low social disorder in the neighborhood during childhood on CES-D scores during pregnancy were maintained only if social disorder in the neighborhood during pregnancy was also low (see Table 3; the CES-D score for both low social disorder in the neighborhood during childhood and low social disorder in the neighborhood during pregnancy is equal to 13.99). Otherwise, high levels of social disorder in the neighborhood during pregnancy were associated with higher CES-D scores regardless of social disorder in the neighborhood during childhood.

Nonparametric Analyses

The SEM model tested interaction assuming a linear regression of CES-D on social disorder in the neighborhood during childhood. Because interactions can be strongly affected by nonlinear transformations, an alternative nonparametric procedure that is robust to distributional assumptions was used to graphically examine the model. As an additional follow-up analysis, LOESS regression was used to examine the relationship between social disorder in the neighborhood during childhood and CES-D scores for different levels of social disorder

Fig. 1 Multigroup structural equation model test of the buffering effect of social disorder in the neighborhood during pregnancy. Models show the moderating effect of social disorder during pregnancy. Only paths significant in both groups were retained. Model fit statistics: $\chi^2_{(6)} = 6.36$, $p = .38$; RMSEA 90% CI = (.00–.04), CFI = 1.00. The test of differential slopes was significant ($p = .037$). Path coefficients larger than the absolute value of .06 were significant ($p < .05$)

Table 3 Predicted CES-D scores from low and high levels of social disorder in the neighborhood during childhood

Social disorder in the neighborhood during pregnancy	Social disorder in the neighborhood during childhood	
	Low (= 6) ¹	High (= 13) ²
Low	13.99	15.47
High	17.71	16.81

¹ The low score included 38% of respondents

² The high score was at the 85th percentile (cut score for the highest 15%)

in the neighborhood during pregnancy. The interaction effect was clearly evident in the LOESS regression plots with a decreasing slope for the regression of CES-D scores on social disorder in the neighborhood during childhood in the high social disorder in the neighborhood during pregnancy group and an increasing slope in the low social disorder in the neighborhood during pregnancy group.

We also examined the joint effects of different levels of social disorder in the neighborhood on the CES-D risk score ($CES-D \geq 16$). For this analysis, we used a $2 \times 2 \times 2$ cross classification to calculate attributable risk (AR) and AR%. The social disorder during childhood variable was dichotomized at its median score. Using this variable and the dichotomized social disorder during pregnancy variable used previously, we formed a four-group cross classification as follows: (a) low-pregnancy, low-childhood; (b) low-pregnancy, high-childhood; (c) high-pregnancy, low-childhood; and (d) high-pregnancy, high-childhood. We then computed percent attributed risk (AR%) for CES-D scores ≥ 16 using the low-low group as the no exposure condition. The AR% values were 19.0%, 41.7%, and 31.2%, respectively. These results are consistent with the MG-SEM results showing the largest risk of depressive symptoms for women with low social disorder during childhood and high social disorder during pregnancy.

Discussion

This study examined whether women's perceptions of neighborhood environment during pregnancy buffered the association of social disorder in the neighborhood during childhood (at age 10 as reference) with depressive symptoms during pregnancy among African American

women. Among women who reported low levels of social disorder in the neighborhood during pregnancy, women who reported higher levels of social disorder in the neighborhood during childhood had higher levels of depressive symptoms (mean CES-D = 15.47) compared with women who reported lower levels of social disorder in the neighborhood during childhood (mean CES-D = 13.99). Other researchers found that social disorder in the neighborhood at ages 11–18 increased the risk of depressive symptoms in adolescence and into adulthood [21]. These results suggest that higher levels of social disorder in the neighborhood during childhood may increase the risk of depressive symptoms during adulthood.

Children living in poverty are more likely to live in neighborhoods with higher levels of social disorder. African American children are more likely to live in poverty compared with non-Hispanic White children with 34% of Black children living in poverty in 2016 compared with 11% of White children [36]. Programs that address social disorder in the neighborhood by reducing poverty or by directly improving neighborhoods may have the potential to buffer the impact of the social disorder in the neighborhood on depressive symptoms during adulthood.

Women who reported high levels of social disorder in the neighborhood during pregnancy also reported higher levels of depressive symptoms regardless of levels of social disorder in the neighborhood during childhood. We found that among women who reported high levels of social disorder in the neighborhood during pregnancy, the levels of depressive symptoms were the same for both groups of low and high levels of social disorder in the neighborhood during childhood (CES-D scores for both groups = 17.25). Other researchers also reported that perceived social disorder in the neighborhood and lack of neighborhood safety during pregnancy were associated with poorer mental health—depression and anxiety [37, 38].

Lack of social support might be one of the pathways by which social disorder in the neighborhood during pregnancy increases the risk for depressive symptoms. Health care providers need to inquire about social support available to pregnant women and create plans of care that involve the available support. Moms2B Ohio is an example of a successful community-based program of pregnancy support [39]. Moms2B provides weekly support sessions and education that includes reproductive health, childbirth, healthy food choices and breastfeeding, child development, and parenting [40].

Neighborhood structural deterioration is thought to lead to the breakdown of families and local institutions increasing disorder and crime and adding to declining mental health [41, 42]. Addition of green spaces (parks, natural areas) in the community might be a potential community-level modification to improve mental health for pregnant women. Increased green spaces have been shown to decrease depressive symptoms. In a group of 442 adults living in neighborhoods below the poverty line, a program that replaced vacant lots with green spaces showed a significant decrease in depressed feelings among the participants [43]. In a study of 7547 pregnant women in the UK, those living in greener areas were less likely to report depressive symptoms, this was particularly true for women with lower socioeconomic status [44]. Green spaces provide areas for physical activity for pregnant women which has also been shown to decrease depressive symptoms during pregnancy [45, 46].

While past studies have not reported on depressive symptoms during pregnancy related to upward neighborhood mobility, research related to upward neighborhood mobility has shown that African American women living in impoverished neighborhoods during their childhoods and throughout adulthood have poorer birth outcomes than women who later moved to wealthier neighborhoods [47, 48]. Using data from the Pregnancy Outcomes and Community Health Study (1998–2004) comprised of Black and white women, Slaughter et al. [49] found that infants born to women who moved up in their socioeconomic position between childhood and adulthood had a reduced probability of being small for gestation compared with infants born to women with static low-socioeconomic positions. These effects may have been driven, in part, by depressive symptoms as supported by our results.

Screening for depressive symptoms should take place during early pregnancy. Women who report depressive symptoms should be referred for psychological evaluation and treatment. Women who report depressive symptoms during pregnancy are more likely to have preterm birth and low-birth weight infants [10–12]. Thus, identifying women with depressive symptoms early in pregnancy might have the potential to not only improve maternal mental health but also improve birth outcomes.

We examined the association of a woman's neighborhood environment both during childhood and during her pregnancy with depressive symptoms during pregnancy.

We did not measure potential biological pathways. DNA methylation may be a potential pathway by which social disorder in the neighborhood is associated with depressive symptoms. In a literature review, Giurgescu et al. [50] reported that four of the five studies included in the review found an association of neighborhood socioeconomic status, social environment, and crime with DNA methylation. One of these studies found a significant association of neighborhood socioeconomic disadvantage and social environment with DNA methylation in inflammation-related candidate genes [51]. Systemic inflammation (e.g., plasma/serum C-reactive protein [CRP], pro-inflammatory cytokine interleukin [IL]-6) has been related to depressive symptoms among pregnant women [52, 53]. Roomruangwong et al. [54] found that increased levels of serum CRP were related to prenatal and postpartum depression. Future research needs to examine potential biological pathways between social disorder in the neighborhood and depressive symptoms during pregnancy.

Limitations

Data were collected during the first 24–72 h after birth. CES-D measures depressive symptoms within the past week. It is possible that women reported depressive symptoms based on the outcome of birth (e.g., preterm birth), thus reporting on postpartum depressive symptoms rather than prenatal depressive symptoms that potentially contribute to PTB. However, evidence does not support recall bias based on adverse birth outcomes [55, 56]. Women's self-report of perceptions of social disorder in the neighborhood during childhood may differ from what the neighborhood was actually like. Prior data suggest, however, that measures of perceived childhood social disorder in the neighborhood correlate with objective childhood measures of social disorder in the neighborhood (e.g., census data) [57]. While prospective reports of perceived childhood neighborhood data may be preferred, retrospective collection of such data is common [57], and evidence suggests accuracy of recall after 50 years in birth cohort studies [58]. Our measures did not include the duration of residence for women during pregnancy. Therefore, we were unable to differentiate the effects of short- or long-term exposure to social disorder in the neighborhood during pregnancy. Finally, slightly more than half of the women in our study were older, married, or cohabiting and had at least

a high school education. Furthermore, nearly all women in our sample grew up in Detroit with approximately half residing in Detroit during pregnancy. Therefore, our results may not be generalizable to dissimilar populations of African American mothers.

Conclusion

Poor neighborhood conditions during childhood increased the risk for depressive symptoms during pregnancy, but effects were weaker when a woman reported better neighborhood conditions during pregnancy. Only the combination of both low levels of social disorder in the neighborhood during childhood and low levels of social disorder in the neighborhood during pregnancy was related to lower levels of depressive symptoms during pregnancy. Women with low social disorder in their neighborhoods during childhood and high social disorder in their neighborhoods during pregnancy had the greatest risk of having depressive symptoms. Health care providers should inquire about neighborhood conditions during childhood and during pregnancy and provide referrals for appropriate professional and community support for women who report social disorder in their neighborhoods and depressive symptoms. Policies to provide community support and improve neighborhoods with the addition of green spaces are two feasible modifications that may decrease depressive symptoms in pregnant women and improve birth outcomes for future generations.

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