

Commentary

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Commentary: Black Mothers in Racially Segregated Neighborhoods Embodying Structural Violence: PTSD and Depressive Symptoms on the South Side of Chicago

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Black Americans continue to experience higher rates of poverty, hyper-residential segregation, and exposure to neighborhood violence compared to their white counterparts^{1,2}. Among Black women, 25% live in poverty³. Black women living in communities with high levels of poverty and violence are subject to psychological stress in the form of perceived threats to their health and safety and actual threats of bodily harm and mortality^{4,5}. David Ford (2012) from ABC News describes how Black women face unfathomable conditions in America. Their experiences should be viewed through an intersectional framework that argues social categories such as race, class, and gender are structurally embedded and dynamically woven together^{6,7,8}. The June 2023 CBS series about Black women and crime, *Investigating Injustice*, by Ramos, Tucker and Thompson reports that Black women are disproportionately affected by violent and property crimes in Chicago. For example, Black women make up 16% of the population in Chicago; however, they represent 25% of the victims of crime. In addition, Black women represent 34% of kidnappings, 35% of assaults, 38% of batteries, 40% of rape victims, and 52% of human trafficking victims⁹.

However, there remains a dearth of information about how the daily experiences of Black mothers living and raising children in environments with increased levels of violence become embodied and often result in poor mental and physical health^{10,11}. Scholars studying the interplay between structural violence, racism, and health disparities often seek to understand the role of genes and the environment in distinct ways: (1) seeing the body itself as an environment, (2) seeing the body as permeable to various chemical exposures, and (3) viewing the body as a place where social experiences, such as discrimination, inequality, and deprivation manifest¹². In this study, we take the third approach and conceptualize the environment as a social phenomenon and examine its consequences on the body. The study aims to examine how feeling “trapped” in racially hyper-segregated neighborhoods with high levels of violence on the South Side of Chicago affects Black mothers’ mental and physical health.

Scholars have been making efforts to further evaluate how one’s biomarkers impact mental health. For example, biomarker 5HIAA may be associated with psychological disorders, like depression and schizophrenia¹³. One pathway that is particularly relevant

in the context of chronic stress, PTSD and the etiology of depression is the hypothalamic–pituitary–adrenal (HPA) axis, which releases glucocorticoid hormones into circulation in order to help the body adapt to severe and/or protracted (chronic) conditions of stress, threat, or uncertainty¹⁴. In humans, cortisol constitutes the primary glucocorticoid “stress hormone” and it modulates a wide variety of cellular functions throughout the body, including metabolism, neural function, immune function, growth, and reproduction^{15,16}. The effects of cortisol on cellular function in humans are mediated in large part by glucocorticoid receptors, which activate (or suppress) the activity of a wide variety of genes throughout the human genome in order to coordinate the body’s overall response to chronic threat or stress¹⁷. Among the genes that are modulated by glucocorticoid signaling is the gene that encodes the glucocorticoid receptor itself (the gene NR3C1). In the presence of chronically high cortisol levels, the NR3C1 gene is down-regulated (i.e., mRNA levels decline) in order to provide physiological negative feedback and prevent over-stimulation. Conversely, when cortisol levels are reduced for long periods of time, NR3C1 mRNA expression often up-regulates (i.e., increases) in order to help sensitize the physiological system to what little glucocorticoid regulation remains available. As such, differences in glucocorticoid receptor expression (NR3C1 mRNA levels, e.g., in circulating white blood cells) can provide an indirect (and inverse) measure of the body’s cumulative exposure to cortisol over time.

The data from this project is from a larger study “The South Chicago Black Mothers’ Resiliency Project.” Utilizing key principles of community-based participatory research and Black feminist thought to understand the lived experiences of single low-income Black mothers who were raising children in neighborhoods with high levels of violence^{18,19}. We had a sample of 68 mothers between the ages of 18 and 62 years, with an average age of 33 years. This multi-level, mixed-methods study sought to integrate information from the cellular level (genomics) to the societal level (residential segregation and violence) to understand how stress “gets under the skin” to negatively affect mental and physical health. Between October and December 2013, we concurrently collected survey and scale data, 5 ml (one teaspoon) blood samples from the mothers, and conducted in-depth hour-long semi-structured individual interviews to understand the lived experiences of the Black mothers.

We had three dependent variables: 1) PTSD - a dummy variable created using responses from the PTSD Checklist. If a participant scored 30 or higher (based on a civilian primary care population suggested cut-point), they were coded as having symptoms of PTSD²⁰. The PHQ-9 Patient Health Questionnaire was used to determine depressive symptoms in respondents. Participants answered ten

questions about issues that may have “bothered” them in the last two weeks such as feeling depressed, trouble sleeping, low energy, change in diet, etc. Possible answers included, “Not at all,” “Several days,” “More than half the days,” and “Nearly every day.” A scale was constructed using the Likert scale responses in which the range is 0 to 22; 3) We assessed mRNA levels for the glucocorticoid receptor (GR) gene (NR3C1) by extracting total RNA from peripheral blood leukocyte samples and assaying NR3C1 mRNA using Illumina HT-12 v4 microarrays in the UCLA Neuroscience Genomics Core Laboratory²¹. Our central independent variable was Feeling “Trapped” Mothers who reported that they wanted to leave their neighborhoods but could not afford to leave are coded as 1, those who did not report wanting to leave were coded as 0. Other independent variables included were age, employment status, education level, number of children and if the subject was currently in school.

The mothers’ survey responses showed that 65% (45 of 68 women) wanted to leave their neighborhood but could not afford to do so. During the in-depth interviews, many of the mothers provided a structural analysis about how they believe racism and/or lack of access to money “traps” them in their neighborhoods. Skylar, a mother in our study, stated “I don’t really want to raise my kids there, but I don’t have a choice. You know, cause it’s what I can afford. But it’s real violent.”

Our regression models showed that Black mothers who were feeling trapped reported significantly more symptoms of PTSD (e.g., disturbing memories and dreams and reliving stressful experiences) than mothers who did not feel trapped. Mothers wanting to leave also reported more depressive symptoms, such as feeling down and hopeless, taking little pleasure in doing things and having trouble sleeping. Notably, the study found that an increase in the number of children the women had, was associated with a decrease in mental distress symptoms. We believe this may be related to the fact that older children can provide the mother with additional care labor and an extra pair of eyes to watch the children in the neighborhood and at home. The study also provide possible mechanisms for how psychological stress gets “under the skin” to affect physical health as we also found that mothers who feel trapped in their neighborhood show a 50% reduction in the odds of high glucocorticoid receptor (GR) mRNA level (OR=0.50, $p<0.001$). (See Mendenhall et al., 2023 for full regression results). For future research we would like to include a control group, to better gauge the disparity for this population.

Overall, the study revealed how feeling “trapped” without resources to move to new areas were associated with mothers experiencing PTSD and depressive symptoms. The stress of feeling “trapped” was associated with lower expression of mRNA for the GR gene NR3C1, suggesting

that mental distress is accompanied by increased cortisol output from the HPA axis (and resulting feedback inhibition of NR3C1 gene transcription).

To improve upon this research, we recommend more culturally-embedded interdisciplinary genomic and epigenetic research that examines systemic racial trauma with community members as citizen/community scientists (CSs). The CSs could help to understand how racial trauma gets under the skin and affects multiple generations using the concept of exposomes. In addition to systemic racial trauma, the exposome research could examine how some mothers may feel a sense of shame in their maternal role and provider role because they are unable to provide their children (and themselves) with the basic human needs/rights of safety and security (as reported by mothers in our study)²². This form of gendered racism means that the total cost of these conditions in the exposome is more than the sum of being Black and female²³.

Darryl Hood at The Ohio State University coined the term Public Health Exposome to reflect a “universal exposure tracking framework for integrating complex relationships between exogenous and endogenous exposures across the lifespan from conception to death²⁴”. In addition to public health contributions, Dorothy Tucker at CBS news suggested a need for a taskforce to examine Black women’s systemic and disproportionate exposure to crime in Chicago. The taskforce could be an avenue where research and community knowledge from CSs inform policies aimed at reducing crime and poverty such as the creation of high-wage jobs, alternative educational pathways and skill training²⁴. One critical public health policy implication involves creating community wellness spaces that bring together community members, stake holders, and funders to implement training, encourage “citizen science” and wellness activities that center the voices and traditional healing strategies found in Black communities to tackle health inequities. The National Recreation and Park Association (NRPA) has implemented successful wellness spaces using a similar model²⁵. For example, the NRPA uses local parks and recreational centers as wellness hubs by working with the SNAP program to provide access to healthy foods. In Chicago’s Woodlawn community, the Salaam Community Wellness Center, directed by Dr. Betty Shabazz, provides community members with a wide range of healing modalities that include Western medicine and more holistic approaches to health (e.g., meditation, food-as-medicine approach, Paradise Garden, counseling, yoga, Reiki, sound therapy, tai chi classes and chi gong classes). We are currently creating a Wellness Store/Space in partnership with Wendell Phillips High School in Chicago with the help of high school and young adult community health workers.

Wellness Stores/Spaces will be critical as policymakers

in Illinois are discussing universal mental health screenings in high schools. Policy makers want to ensure that students who may need mental health support have access to a range of wellness tools such as community groups, stress reduction activities, therapy, etc. Wellness Stores/Spaces could help prevent mental health challenges and decrease their severity through tools co-created with the youth and community and informed by science.

Another suggestion related to screenings is to screen for stress at medical visits the same way that we currently screen for domestic violence and depression. We are working towards a world where youth (middle and high school age) and adult Community Health Workers have the necessary resources to create Wellness Stores/Spaces that have low- and high-tech healing solutions, including innovations in cancer detection and affordable housing. We are working towards a world where social determinants of health are eliminated and individuals, families and communities are no longer ravaged physically and emotionally by systemic oppression that includes an exposome where they disproportionately experience high levels of crime.

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