Natural Disasters, Intimate Partner Violence, and Reproductive Harm: A Biocultural Analysis of Hurricane Katrina

by

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Abstract

Natural disasters can have serious impacts on people's reproductive lives, which with climate change have become more evident. To date, research has focused on the impacts of natural disasters on fertility rates, access to reproductive health care, and on pregnancy outcomes. Less focus has been placed on how natural disasters affect indirect sources of reproductive harm such as intimate partner violence, which is documented to increase in frequency and severity during pregnancy and the post-partum period. This research sets out to explore the syndemic of natural disasters, intimate partner violence, and adverse health impacts on maternal and neonate bodies. Using a reproductive justice and body environmental framework to analyze previous research on this topic, this project aims to understand the unequal reproductive injustices exacerbated by exposure to natural disasters and intimate partner violence.

Key Words

Hurricane Katrina, Intimate Partner Violence, Reproductive Justice, Environmental Racism, Structural Violence

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This research is dedicated to survivors of intimate partner violence as well as those who have lost their lives to intimate partner violence.

"Miners used canaries with sensitive respiratory systems to alert them to poisonous gasses in the atmosphere of the mine. In a similar manner, vulnerable communities of black and brown Americans foreshadow the underlying problems likely to poison the US system. In August 2005, black women of New Orleans became the nation's miner's canary" (Harris-Perry 2011, 16)

Introduction

Climate change has become a pressing global concern as the political, social, and economic consequences of changing weather patterns such as rising air temperatures and, sea levels, become more apparent. As the intensity and severity of weather patterns increase due to anthropogenic induced climate change, so will the detrimental consequences to human life. Previous studies have indicated that natural disasters do not affect all humans the same, and the burden of adverse outcomes is heaviest for already vulnerable communities (Thomas et al. 2019; Cartwright 2019). Differential vulnerabilities result from a complex web of historical, cultural, political, and economic factors that empower some communities to adapt to environmental dangers, while others are forced succumb to it. In August 2005, Hurricane Katrina exposed these institutionalized vulnerabilities in New Orleans for the world to see. The preventable suffering of thousands of Black and poor individuals was plastered on the front-page and screens of national news.

A second disaster occurring within Louisiana and the broader United States is the high rate of maternal and neonatal mortality and morbidity, especially among Black mothers and babies. According to the Louisiana Department of Health "four black mothers die for every white mother and two black babies die for every one white baby" (LDH 2019). A study conducted by Wallace (2020) revealed that homicide is the leading cause of death during pregnancy and the postpartum period in Louisiana, highlighting the tie between intimate partner violence severity

and pregnancy (ACOG 2012). In 2012, the American College of Obstetrician and Gynecologists declared intimate partner violence to be a significant, yet preventable public health crisis that unequally burdens women of reproductive age (ACOG 2012). This type of violence against women is institutionalized within the culture of the American South, stemming from hundreds of years of overt racism, sexism, and poverty.

Although both of these crises, differential environmental vulnerability and intimate partner violence, lead to the preventable death and suffering of thousands of individuals yearly, there is relatively little literature exploring the syndemic between them. This essay sets out to analyze the embedded cycles of social injustices and how these are demonstrated in health disparities.

Anthropological research provides a unique perspective for understanding the health effects of anthropogenic climate change as we strive to understand local contexts through individual, political, social, environmental, and temporal conditions (Cartwright 2019). The practice of using a broad framework to understand personal life experiences allows anthropologists to humanize societal problems, making them easier to empathize with. Anthropologists have a duty to understand the complex entanglements between the social, cultural, and environmental conditions of the human body, especially when there is an unequal burden of suffering on a specific population. The results from this anthropological research will hopefully shed light on how society can address institutionalized violence against women, which is exacerbated by natural disasters, in order to discontinue historical cycles of social and biological harms.

Research suggests that climate change has influenced the patterns of natural disasters, providing a unique opportunity to explore the concentrated effects of anthropogenic induced environmental

fluctuation. Holland and Bruyere (2014) conducted a simulation study comparing the effects of climate activity with and without anthropogenic gases and aerosols on global hurricane patterns. Their simulation showed no association between anthropogenic climate change and frequency of hurricanes; however, they found a strong correlation between an increased proportion of Category 4 and 5 hurricanes and anthropogenic climate change. These findings highlight the connection between human induced climatic instability and increasingly dangerous storms. Anthes et al. (2006) suggest that the increased warming of the ocean, as well as increasing water vapour are the likely causes of increased intensity of hurricane activity and are expecting them to continue becoming more severe over the century. However, Anthes et al. (2006) also state that even if hurricane activity stayed the same, the increase in general human population, residency by coastlines, as well as beach and wetland erosion due to an increase in sea level, will all lead to more damage and human suffering.

New Orleans and Hurricane Katrina present an ideal case study for understanding the biocultural disruptions of natural disasters. Hurricane Katina made landfall in the United States on August 29th, 2005 and was one of the deadliest and most costly natural disaster in the history of the United States. New Orleans was hit especially hard, and with the dysfunction of the levee's generating mass flooding, New Orleans drew international attention. The disaster relief provided by the Federal Emergency Management Agency (FEMA) was heavily criticized on their evacuation protocol and overall performance, which many believe resulted in the high death rate and could have been easily avoided. The United States protocol for natural disasters was tested by Hurricane Katrina and the faults in preparedness were obvious within New Orleans. The severity of Hurricane Katrina can act as a looking glass into the inevitable future of natural

disasters severity and damage. The health impacts, especially on Black communities and those of low socioeconomic status, can also act as a looking glass into the vulnerability and disproportionate burden of risk borne by some communities in the face of natural disasters. As Frymer, Strolovitch, and Warren (2006) powerfully put it, "if policymakers and the public heed the lessons of Katrina and make efforts to address the structural and institutional sources of American inequality, perhaps the brunt of future disasters will not be borne by those who are least able to endure their costs" (52-53).

This essay to address three main questions: 1) why were Black and poor communities hit the hardest during Hurricane Katrina; 2) how did the experiences of these communities affect frequency and severity of intimate partner violence; and 3) how do these two intermingling traumas affect reproductive health in pregnant individuals?

Throughout the exploration and analysis of these questions, I will argue that intimate partner violence, and the resulting reproductive harm, is not exclusively due to individual action on a local scale, but rather part of a complex web of deep-rooted structural inequalities and violence which are exacerbated and exposed during natural disasters.

In the first section of my essay, I will outline the methods, analytical approaches, and key terms used in my research. Second, I will summarize the results of my secondary analysis in three categories: 1) unequal effects of Hurricane Katrina, 2) intimate partner violence factors, 3) the health outcomes of pregnant individuals who experience intimate partner violence in a natural disaster context. In my third section, I will discuss my results in regard to intimate partner violence during pregnancy in a disaster context. In my fourth section, I will discuss the

interconnections between historical cultural geographies of New Orleans, persisting environmental racism, and structural violence as well as the implications these broader systematic forces have on individual's reproductive health.

Reflexivity Statement

As an affluent white cis able-bodied woman researching on the unceded territory of the Lekwungen peoples, I hold immense social privilege compared to many of the individuals described in this project. As a woman growing up in a society that values hyper-masculinization, I have experienced firsthand the gender-based violence embedded within social life. However, I recognize my ability to choose to engage with racial and LGBTQ2+ social injustices, as many do not have a choice and are forced to endure in them daily throughout their lived experience. I am grateful to have access to the resources needed to pursue this research project, although, I acknowledge the ways in which my privilege contributes to the continued disenfranchisement of many.

Methods

This project draws largely on previous research studies and literature on the topics of Hurricane Katrina, intimate partner violence, and reproductive outcomes, using a secondary analysis methodology (Payne and Payne 2004). This methodology allows me to use previously collected materials, including both qualitative and quantitative data, in order to answer novel questions (Payne and Payne 2004). The benefit of using a secondary analysis methodology is the ability to use multiple sets of data on a broad range of topics in order to understand the complexities between distinct phenomena. Another benefit of using secondary analysis is the ability to

extrapolate previous findings to understand an issue with little data. For example, the chaos induced by natural disasters makes it hard to keep track of population statistics in a certain geographic area as many individuals are displaced leading to potentially problematic representation. Using data that is collected on sensitive issues such as intimate partner violence is another example, as it hinges on the willingness of individuals to come forward and report it. The underreporting of intimate partner violence may lead to inaccurate portrayal of incidences within a population. Thus, using reliable sources of information based on steady populations allows me to extrapolate what we do know about these phenomena into a situation where data may become unreliable and distort realities.

Analytical Approach

This essay reproduces the analytical approach used by Powell, Jeffries, Newhart, and Steins (2006) in their chapter, *Towards a Transformative View of Race*, in the book, *There is no such thing as a natural disaster: Race, Class, and Hurricane Katrina*. Powell et al. approach the topic of racism and poverty, with regard to Hurricane Katrina, in a broad structural framework of analysis; suggesting, "in order to be useful as a transformative tool, as we propose here, the term [racism] must be divorced from its association with individual actors or racist actions" (Powell et al. 2006, 62). The intentions of this essay and of Powell et al.'s (2006) work is not to take away individualistic responsibility for unjust acts, rather, it is meant to focus our understanding on the institutionalized actions and inactions that support a system that perpetuates the appalling transgressions enacted every day in the world, and more specifically, in the United States such as police violence against Black individuals. This broader focus is also beneficial in that it allows us to acknowledge the highly neglected historical systems in the United States and in New Orleans that enabled the conditions following Hurricane Katrina and the deaths and displacement of so

many Black and low-income residents. This broader approach will be used to understand not only poverty and racism, but also intimate partner violence within this essay.

In order to humanize the focus on structural inequalities with the lived experiences of individuals who survived Hurricane Katrina and intimate partner violence, I rely heavily on many different research and oral history projects including Kelley Ponder's (2016) dissertation, *Perceptions of domestic violence and help-seeking behaviours among women in post-Katrina New Orlean*, as well as the Alive in Truth project oral history project (n.d.).

The broad systematic framework used by Powell et al. (2006) reflects work done by anthropologist Paul Farmer and the concept of structural violence. Structural violence can be defined as normalized ways in which the longstanding organization of our society, including the economic, political, and cultural elements, leads to the physical harm of people (Farmer, Nizeye, Stulac, and Keshavjee 2003). This will be used as a core concept throughout this essay to understand how socially constructed inequalities exacerbated the adverse consequences of Hurricane Katrina, resulting in unequal burdens of intimate partner violence and thus reproductive harm.

Social, political, economic, and environmental conditions in which individuals live have a direct impact on human health. The concept of body environmental intertwines the framework of structural violence with the local environment to understand these "on-the-ground health ramifications" (Cartwright 2013, 437). Specifically, this approach highlights the concentrated consequences of natural disasters on individual biological systems (Cartwright 2013). The body

environmental provides an analytical approach to understand the complexities between Hurricane Katrina, intimate partner violence, and multiple aspects of reproductive health, including physical, social, psychological, and transgenerational aspects. Furthermore, body environmental can highlight how the social and environmental conditions of ancestors became embedded within populations, evident in the vast health disparities present in the United States.

The cultural geography that makes up the city of New Orleans is not a natural phenomenon, rather, it highlights the deep historical implications of colonization, slavery, segregation, and the continued institutionalized racism experienced today. Thus, New Orleans illustrates deep and on-going environmental racism wherein "minority and low-income communities [face] disproportionate environmental harms and limited environmental benefits" (Taylor 2014, 2). This concept will be used to understand the intentional groundwork of New Orleans that condemns Black and poor communities to live in unsafe environments.

Branching off of the empowerment versus disempowerment of communities and individuals within a society, is the concept of stratified reproduction. Stratified reproduction "describe[s] the power relations by which some categories of people are empowered to nurturer and reproduce, while others are disempowered" (Ginsberg and Reiter 1995, 3). The Goldberg machine that links unequal effects of natural disasters across a population, the increased frequency and severity of intimate partner violence, and the consequential lack of social, political, and economic support in the aftermath, all contribute to the disempowerment of reproductive health in some communities more so than others. The concept of reproductive stratification will be used to identify the

differences of support networks in the wake of a natural disaster and the subsequent empowerment/disempowerment of some community's reproductive health.

Reproductive justice is a multi-ethnic social movement that combines the core principles of reproductive rights and social justice in that "the human right to maintain personal bodily autonomy, have children, not have children, and parent the children we have in safe and sustainable communities" (Sister Song n.d.). Having the autonomy to make your own reproductive choices is essential in the sense of human rights, however, it is crucial that the right is coupled with the ability to access the essential resources needed to implement your choices. Furthermore, reproductive justice requires systematic changes that enable all individuals to fulfill their reproductive intentions in a safe space. Reproductive justice demands a critical intersectional approach that analyzes power systems that undermine the rights and access to essential services to specific individuals including Indigenous women, women of color, trans* people, and the poor (Sister Song n.d.). Unfortunately, there is not enough space in this project to adequately address all communities whose reproductive health is negatively impacted by natural disasters; thus, I am focusing on the two main communities that were most largely affected by Hurricane Katrina, Black and the poor. Reproductive justice is truly the focal point of this project.

An anthropologically driven bio-cultural approach is essential to understand the complexities presented by the intersection of natural disasters, intimate partner violence, and reproductive health. By combining the concepts of structural violence, body environmental, environmental racism, stratified reproduction, and reproductive justice I aim to understand not only the broad

societal implications but the impacts these have on individual human bodies. This integrative approach will highlight how Hurricane Katrina reinforced and reproduced historically inaugurated patterns of social and biological harms.

Key Terms

Domestic violence is a term used to describe a world-wide phenomenon of violence taking place within a household which include incidences such as violence against children and parents or violence between married partners (Wallace 2015). Domestic violence is the most common form of violence against women, and according to the 2012 World Health Organization Global Review, up to 70% of women have had some experience of DV in their life (Bartolomei 2015). The historical origins of the term "domestic violence" stems from the traditional arrangement of a wife and husband living together (Wallace 2015). This essay uses the term intimate partner violence (IPV) in order to include all current or past romantic partnerships, whether they live together or not. The concept of violence in this situation can take many forms including physical, sexual, psychological, emotional, and economic abuse (Ponder 2016). Although IPV affects all genders and identities globally, this research project narrows the scope to heteronormative couples in which the male partner is the initiator of the violence. I recognize the decision to exclude other types of relationship dynamics reinforces problematic binaries in which our society is situated. However, a report conducted by the United States Department of Justice concluded that the majority of domestic abuse reported in the United States was committed against females by males (Truman and Morgan 2014).

The discipline of anthropology was founded in the depths of a colonial ethnocentrism, which has had a lasting impact on society and the field of study. Specifically, the exploration of "race" as a

biological determinant was a large part of our dark history and is still being used today to defend racist ideals in pseudoscience projects (Evans 2018). My research project utilizes previously reported data and literature from the United States, which all use the term "race" to differentiate different groups within the population, so it will also be used in this essay for continuity purposes. However, this research project acknowledges that the term race has no "biological referent when applied to the human species" (Dressler, Oths, and Gravlee 2005, 243). In this essay, "race" is more closely aligned with the concept of "ethnicity" which is a socially constructed system in which group of people have a shared history, culture, or kinship (Dressler, Oths, and Gravlee 2005). The need to specifically define the concept of race within public health research is crucial in moving the discipline of anthropology forward into a useful tool to understand health disparities across populations (Dressler, Oths, and Gravlee 2005).

Understanding the complex concept of health is essential to this project. For this essay, health is not just defined as the absence of illness or disease, but "in terms of access to and control over the basic material and nonmaterial resources that sustain and promote life at a high level of satisfaction" (Singer and Baer 2012, 78). This means having the ability to exercise bodily autonomy as well as access to essential and culturally appropriate resources. Another concept intertwined within health is health disparities, which "refers to the differences in morbidity, mortality, and access to health care among population groups defined by factors such as socioeconomic status, gender, residence, and especially "race" and "ethnicity"" (Dressler, Oths, Gravlee 2005, 232).

Literature Review

Hurricane Katrina demanded attention from academics in multiple different fields of study due to the size of the event and the ultimate failure of the government's ability to protect its citizens. This literature review focuses on the unequal effects of Hurricane Katrina, IPV factors, and health outcomes associated with IPV.

Unequal Effects of Hurricane Katrina

Hurricane Katrina was far-reaching in every sense of the word; it geographically affected 90, 000 square miles of the United States, it physically up-rooted millions of people, it was the first hurricane in the United States to receive 24/7 television coverage, and was the most expensive natural disaster to affect the United States at 161 billion USD in damages (Morse 2008). Although many were affected by the storm, Hurricane Katrina disproportionately affected poor and predominantly Black communities. According to the United States Congressional Research Service (CRS), one fifth of the population (144, 000 individuals) that was most directly impacted by the Hurricane were considered poor, which in 2004, this was considered to be $19, 307 USD for a 4-person family (CRS 2005). Thitry precent of those were living on incomes one-and-one half times below the poverty line, and more than 40% of those were living on an income twice below the poverty line (CRS 2005). Additionally, the CRS estimates that 310, 000 Black individuals were directly impacted by the storm, primarily due to the extensive flooding that occurred after the levees broke (CRS 2005). This led to 272, 000 Black individuals to be displaced, which accounted for 73% of Orleans Parish population. Comparatively, only 101, 000 non-Black individuals being displaced, which accounted for 63% of the parish population (CRS 2005). The themes of race and poverty are not mutually exclusive, which is evident in that 34%

of displaced Black individuals were poor, compared to only 14.6% of poor non-Black folk who were displaced (CRS 2005).

As the poor and Black were disproportionately affected by Hurricane Katrina, so were women. Cultural conceptions within patriarchal focused North America, were the women in a relationship is typically the homemaker, and the man in a relationship is the protector and breadwinner, limits many women's abilities to access basic resources. Interviews with women living in New Orleans have attested to these well-defined gender roles, especially in regard to receiving equal economic and political opportunities (Ponder 2016). Even if relationships don't usually follow this blueprint, research on Hurricane Andrew suggested that many couples will resort to these socially entrenched gender roles during a natural disaster (Thomas et al. 2019). The lack of control over economic and social capital can make it harder for women to independently cope with the disruption caused by natural disasters (Thomas et al. 2019). Furthermore, women are often the ones caring for family members suffering from poor health or disabilities, making it much more difficult to manage the logistics of an evacuation (Butterbaugh 2005). The challenges described above are evident in the fact that women accounted for 54% of the population of New Orleans, but they made up 80% of the people that had to ride out the storm when New Orleans was locked down, making them particularly vulnerable to the atrocities laid out in the wake of Hurricane Katrina (Butterbaugh 2005).

Intimate Partner Violence Factors

Risk factors for IPV vary significantly depending on culture, geographic location, and institutional factors such as adequate laws and social safety nets. It is important to keep in mind that IPV knows no bounds and individuals from all life courses may experience violence during

their life. It is extremely difficult to pinpoint what factors may increase an individual's vulnerability to IPV as it is an extremely complex public health concern. However, the literature highlights some ongoing patterns that have been suggested to increase the likelihood of experiencing a susceptible environment. This literature review will focus on the influence of gender-based roles, marital status, decision-making power, socioeconomic status, inadequate laws, physical displacement, and pregnancy.

Gender norms in a society outline the specific roles and expectations of behaviour for individuals displaying certain binary traits (Ponder 2016). Heterosexual relationships are highly governed by the systematically prescribed script of hypermasculinization and hyperfeminization within westernized countries (Ponder 2016). The traditional masculine script refers to extreme self-confidence, emotional unavailability, social dominance, and reacting to threats with aggression (Rogers et al. 2020). A study conducted by Roger et al. (2020) in Southwest United States, explored the relationship between adolescents and conflict resolution. Roger et al. (2020) found that adherence to the typical masculine model in adolescent boys resulted in a reliance on coercion tactics in intimate partner disagreements. A similar study conducted by Reidy et al. (2015) in Michigan found that when adolescent boys undergo discrepancy stress, in which they fail to live up to the traditional masculine script, they are more likely to engage in violent sexual acts.

Marital status has been shown to be another patterned indicator in regard to potential IPV. Specifically, women who are partner-less, in that they are divorced or separated, or they are in a relationship where the partner does not share the same domestic space, were more vulnerable to

potential IPV (Ponder 2016). These rates are higher due to the increased potential for conflict over specific resources, assets, children, as well as jealousy over a woman moving on with a new partner (Ponder 2016). A cross-cultural study across 30 different countries conducted by Wilson (2019) on demographic characteristics and IPV supported this claim and found that married respondents had a lower prevalence of IPV compared to non-married respondents.

Decision-making power has been reported to be a crucial indicator in factors regarding IPV susceptibility for both men and women. Women who experience a lack of control over familial decisions, economic resources, education, and employment overall have a higher incidence of IPV (Ponder 2016). There are many mechanisms in which control over decisions is eliminated, but a fairly common one is through social isolation in which the perpetrator takes away opportunities to have a job, leave the house, and contact families and friends (Ponder 2016). Different types of support are crucial in buffering IPV as well as recovery from the experience, and when taken away can lead to detrimental effects. Lanier and Maume (2009) found that social isolation, in which a female partner has limited contact to the outside world, is an influential component of IPV within the United States. A lack of decision-making power on the male's side may also increase IPV, as men may feel discrepancy stress due to lack of dominance and control, although this is less common (Ponder 2016).

Geographic location may also contribute to potential IPV susceptibility, in terms of social cohesion, physical access to resources, and housing options. A study conducted by Murray et al. (2018) focused on how changes in location influenced immigrant and refugees experience of family violence. Results indicated that lack of permanently available housing, remote/isolated

communities, and lack of access to information about local support services all negatively influenced their experiences of family violence (Murray et al. 2018).

Socioeconomic status has been pursued as another potential indicator IPV. A literature review conducted by Dardis et al. (2015) on dating violence between men and women found that low socioeconomic status increased male initiated dating violence within the United States. Another study conducted by Schwan-Reese, Peek-Asa, and Parker (2016) identified that overall number of financial stressors as well as four specific financial stressors including utility nonpayment, housing nonpayment, food insecurity, and disconnected phone service, were all associated with verbal threats, minor physical IPV, and severe IPV. An additional cross-cultural study conducted by Dalal, Lee, and Gifford (2011) found that low socioeconomic and unemployment were positively associated with the justification of IPV across South Asia.

Inadequate laws and social safety nets are also seen as a possible indicator of increased IPV within a society. A study conducted by Hirsch (1999) found that women in the United States, where there are relatively more economic opportunities, rights to privacy, and better legal protections, had a better ability to demand violence free relationships compared to women in Mexico. Other studies suggest a woman is more likely to file a complaint of IPV when there are legal statutes that ensure preservation of monetary assets as well as child custody (Larrain 1999). Furthermore, reactions from law enforcement may also prevent women from coming forward to file a complaint. A study conducted by Sullivan et al. (1992) highlighted that many police officers became frustrated with checking up on repetitive calls and began questioning the

legitimacy of the women's story as well as criticizing the women for staying with the abusive partner.

The association between pregnancy and IPV is less established than the other factors, however it is an important indicator to discuss. A research project conducted by Burch and Gallup (2004) found that frequency and severity of male-initiated intimate partner violence doubled when female partners became pregnant. A similar research project conducted by Silverman, Decker, Reed, and Raj (2006) using data from Pregnancy Risk Assessment Monitoring System found that 5.8% of women reported physical abuse perpetrated by a male partner either during or prior to pregnancy, with Native American and Black women reporting the highest rates. A study conducted by McFarlane, Campbell, Sharps, and Watson (2002), found that the risk of a completed femicide and an attempted femicide increased by three times when an individual was pregnant, and even more than three times for Black women. However, other studies found no correlation between pregnancy and increased intimate partner victimization (Taylor and Nabors 2009) and others have identified that pregnancy could even serve as a protective factor against violence (Decker et al. 2004; Jasinski 2001).

Intimate Partner Violence Health Outcomes

IPV can influence both maternal as well as fetal health outcomes. Since IPV is most prominent during the reproductive age of women, it is essential to understand the potential consequences of this violence (ACOG 2012). This portion of the literature review will discuss the effects of IPV on the female partner and neonate in terms of health on a personal, social, and temporal level.

The following descriptions are a brief outline of some of the health outcomes of IPV and is not representative of all potential health outcomes associated with IPV.

IPV can result in many different acute physical injuries in all areas of the body, including genitalia, such as abrasions, contusions, lacerations, fractures, dislocations, and puncture wounds (ACOG 2012). Many of these injuries can result in more chronic physical afflictions such as sexually transmitted diseases, sterility, broad-spectrum infection, ongoing pain, limb paresis or plegia, osteoarthritis, and death (ACOG 2012). Furthermore, IPV in the form of physical abuse has been associated with long-term health consequences and an increase in chronic disease such as asthma (Coker et al. 2002; ACOG 2012).

The use of control as a tactic of violence can lead to unintended pregnancies due to birth control sabotage or refusal to practice safe sex, sleep and appetite disturbances, forced sterilization, and adverse psychological outcomes. A study conducted by Al-Modallal et al. (2012) found that working women experiencing IPV had significantly higher levels of depressive symptoms and stress. Another study conducted by Tiwari et al. (2015) found that Chinese women who were experiencing IPV with severe controlling conditions experienced symptoms of depression and of Post-Traumatic Stress Disorder (PTSD). These psychological consequences can further lead to substance abuse and suicide (ACOG 2012).

IPV does not only affect the physical body and mind, but also the social and cultural fabric of communities. Individuals who have experienced IPV may be negatively affected in regard to their ability to work independently and provide economically for herself and her children (Grady,

Hinshaw-Fuselier, and Friar 2013). Social cohesiveness and human connection are also heavily impacted by IPV as perpetrators may isolate their partners and cut off all outside contact, dissolving the social infrastructure (ACOG 2012).

The effects of IPV on pregnancy and fetal outcomes have also been explored. A study conducted by Martin-de-las-Heras et al. (2019) on pregnant women experiencing IPV in Andalusia, Spain reported that psychological IPV was significantly associated with an increase in Urinary Tract Infections (UTI), vaginal infection, and spontaneous preterm labour. Physical IPV was correlated with increased antenatal hospitalizations (Martin-de-las-Heras et al. 2019). A meta-analysis conducted by Donovon et al. (2016) found that IPV was significantly associated with preterm birth and low birthweight. These complications all have crucial effects on fetus health outcomes. For example, vaginal infection and UTIs can lead to preterm labour, amniotic fluid infection, premature rupture of fetal membranes, and low birth weight, which subsequently increase the chances of prenatal mortality (Donovon et al 2016). Furthermore, preterm birth and low birth weight may predispose these individuals to adult health challenges such as increased risk of neurodevelopmental disabilities, lower educational achievement, and higher rates of chronic conditions (Bjorkqvist et al. 2017; Husby et al. 2016) Ground-breaking research also suggests that placental epigenetic modifications may contribute to intrauterine growth and adulthood height determination. Both of these growth conditions are associated with small-for-gestational-age, which can be an indicator for preterm birth, adding a transgenerational element to the effects of IPV on fetal outcomes (Kozuki 2015).

Epigenetics can be defined as “the study of chemical modifications to DNA that are associated with changes in the way genes are expressed, or “turned on”” (Thayer and Non 2015). Understanding epigenetic variation caused by early environments of humans can allow anthropologists to understand “how variation arises despite fundamentally similar genetics” (Landecker and Panofsky 2013). Epigenetic markers are especially important when understanding health and disease patterns as it combines the understanding of genetic predisposition with environmental risks; “epigenetics thus represent a literal biological mechanism of embodiment” (Thayer and Non 2015, 723). Both IPV and natural disasters are recorded to have an effect on the epigenetics of a neonate. A study conducted by Radtke et al. (2011) found that prenatal exposure to physical IPV is associated with a permanent change in the activity of the neonate’s DNA, called methylation, which may inhibit their adult psychosocial function. A study on rats conducted by Cordero et al. (2012) found that male rats were highly aggressive with their female-partners after experiencing non-social stressful experiences. Furthermore, their offspring also indicated high aggression towards female-partners, even in the absence of postnatal father-offspring interaction (Cordero et al. 2012). Although this research is an experimentation with rats, it highlights the possibility that IPV can be biologically induced though stressful periods and parental experiences. A study conducted by Cao-Lei et al. (2014) on pregnant women in the 1998 Quebec ice storm found that infants whose mothers were in objectively high degrees of storm exposure had lower Bayley IQ scores, which assesses the development of infants and toddlers, compared to the control population. Results also highlighted variances in receptive language abilities at age 2 years, which were especially significant when disaster exposure was during early pregnancy (Cao-Lei et al. 2014). The research also reported a connection between objective prenatal maternal stress and increased

body mass index at age 5 as well as increase in insulin secretion and proinflammatory cytokines in adolescence, indicating the exposed infants were at an increased risk of developing adulthood chronic disorders (Cao-Lei et al. 2014). Another study, focusing on the effects of the Iowa flood on pregnancies, found similar results in regard to cognitive development and storm exposure (Dancause et al. 2014). A similar study conducted on the effect of the Queensland flood found that exposure to the storm during the third trimester negatively impacted infant motor development (Olson et al. 2018).

Results

Pulling from literature reviewed above, Hurricane Katrina created a vortex of vulnerabilities that potentially increased the rate and severity of IPV, thus accelerating the reproductive harm experienced by pregnant individuals, specifically in poor and Black communities.

The Southern United States has long had a strong traditional male societal script in which men are the providers and react to threats through aggression (Ponder 2016). As suggested above, even if relationships normally deviate from this social script many revert to it during natural disasters (Thomas et al. 2007). In times of extreme duress, such as experiencing a hurricane, the ultimate lack of control experienced by a partner may encourage them to react to stresses and threats through aggression towards their partner. In addition, the financial burden that followed the storm, caused by losing possessions, living spaces, and employment opportunities, was likely an influential factor in increased frequency of male initiated IPV.

> "We were kind of on and off because I think a lot of it has to do with the stress. I was the sole provider at the time because he had lost his job back in New Orleans. It wasn't a job that he could have transitioned with, so it was a lot of stress on him because I was doing

> everything financially, and just really being the breadwinner and holding everything together and, as a man, I guess that's really hard for them. So that kind of put a strain on our relationship" – 23-year-old Black woman living in Dallas (Lowe, Rhodes, and Scoglio 2012)

Hurricane Katrina was also reported to have a substantial impact on marital and partner relationships. A study conducted by Lowe, Rhodes, and Scoglio (2012) found that a majority of participants experienced negative relationship changes due to the storm, with some relationships ending. According to the literature reviewed above, this change in intimate relationship dynamics due to the storm may have accelerated IPV rates.

When Hurricane Katrina hit New Orleans, feelings of loss of control and a sense of powerlessness may have triggered a need to dominate in male partners leading to increased IPV. Lack of decision-making power on a woman's side may have led to increased reliance on abusive partners, making it harder to leave the situation if the individual chose to do so.

> "Plus he hit me. I don't love him like that. So in my mind, I didn't want to be back to him . . . Because of Katrina, I think that's the reason I got back to him . . . If we were at home and take Katrina out of the equation, I wouldn't have gotten back with him. We got back together because I was coming back to Dallas and he was like, ''I'm going to stay out here with you. I'm going to help you out. We are going to do this thing together,'' and then I started pondering things. I didn't tell my family I was going back with him" – 28-year-old Black women living in Dallas (Lowe, Rhodes, Scoglio 2012)

Social isolation also increased exponentially as electricity, Wi-fi, and mobile services were all ravaged for weeks after Hurricane Katina, limiting any communication with distant friends, family, and essential services. Individuals residing within New Orleans, whose living accommodation in the city were destroyed, were transported to cramped dirty FEMA trailer parks across the American South. Multiple studies have identified this specific circumstance to

directly exacerbate the prevalence of IPV. According to a study conducted by Larrance, Anastario, and Lawry (2007), 25% of women interviewed reported being beaten by a spouse at some point in their life, while 2% of women reported violence and sexual assault by a spouse since displacement. Furthermore, 68% of respondents did not feel safe in their trailer, community, or walking around at night, a majority of them being women (Larance, Anastario, and Lawry 2007). Twenty one percent of respondents also reported no security in their trailer community (Larance, Anastario, and Lawry 2007). Another study conducted by Anastario, Shabab, and Lawry (2009) on internally displaced Hurricane Katrina victims in Mississippi, found similar results in terms of IPV. For example, prevalence of IPV rose from 2.5% in 2006 to 7.6% in 2007 (Anastario, Shabab, and Lawry 2009). Lifetime IPV, defined as ever having experienced IPV throughout the lifecourse, increased from 12.5% in 2006 to 34.4% in 2007 (Anastario, Shabab, and Lawry 2009). Furthermore, the increased IPV rate did not return back to the baseline for 2 years following displacement due to the storm, increasing from a lifetime estimate of 3.4/100,000 pre-Katrina to 9.4/100,000 in 2006 and 10.1/100,000 in 2007 (Anastario, Shabab, and Lawry 2009). This highlights the escalated risk during the first year of displacement and the continued risk in the years following in regard to the increasing incidence of IPV within this population. A study conducted by Schumacher et al. (2010) exploring the incidence of IPV 6-months before and after Hurricane Katrina corroborates the results in the previous studies (Schumacher et al. 2010). In the six-months prior to the storm, 89 women reported experiencing IPV, which increased to 111 women post-Katrina, resulting in a 35% increase (Schumacher et al. 2010). Physical IPV had a much larger increase, with 11 women reporting physical IPV pre-Katrina and 17 women reporting incidences post-Katrina resulting in a 98% increase (Schumacher et al. 2010). Statistical analysis examining predictors of post-hurricane IPV

revealed that individuals who experienced a number of hurricane-related stressors such as displacement or housing and food shortages were at a heightened risk of psychologically and physically abusive conflict strategies (Schumacher et al. 2010).

Legal strategies and social safety nets were largely wiped out due to Hurricane Katrina. Lack of safe housing and shelters, and the inability to talk with government agencies due to communication black out, may have forced women to stay with their violent partner (McCathy-Brown and Waysdorf 2009). Access to the FEMA financial assistance, benefits, and living accommodations also put women at risk since only one member of a household can make a claim. This may have pressured women into negotiating with a potentially violent partner in order to secure economic stability and shelter (McCathy-Brown and Waysdorf 2009). Furthermore, all infrastructure in Orleans parish constructed to support those in relationships with IPV were destroyed during Hurricane Katrina and five of the eight domestic violence detectives in the New Orleans Police Department left due to the storm, creating inadequate legal support (Buttell and Carney 2009).

> "A domestic violence victim evacuated to Houston with her children and received a FEMA voucher to house her and her children. At that time there were, and still are, two open criminal cases against the husband in New Orleans. They had been living apart and she had not yet received her divorce. He initially evacuated to Lafayette. He was able to find her, and he moved into her apartment in Houston and won't leave as he argued that the voucher is meant for him also. Her divorce attorney told her she cannot get the divorce until they are living apart. She now has the choice to move out with nothing or live there hoping the police can come should thee continuing verbal abuse escalate." – A typical story reported by an advocate (Jenkins and Phillips 2008)

Lastly, differential experiences of Hurricane Katrina increased the vulnerability of experiencing IPV in Black and poor communities. A study conducted by Harville et al. (2011) examined the

relationship between Hurricane Katrina experience and reported relationship violence in a cohort of 248 postpartum women. Results highlighted that certain experiences of the hurricane were associated with an increased likelihood of conflict within a relationship as well as reliance on violent conflict resolution (Harville et al. 2011). Specifically, experiencing property damage during the storm resulted in a strong relative risk of physical violence (Harville et al. 2011). Experiencing an injury during the storm resulted in increased instances of insulting or shouting and reported sexual violence (Harville et al. 2011). The feeling of imminent danger due to the hurricane, once adjusted for cofounders, was associated with punching or kicking, destroying property, and forcing sex (Harville et al. 2011). Stress due to daily hassles was examined as a potential mediator between the hurricane and IPV (Harville et al. 2011). Results highlighted that this stress was associated with numerous conflict tactics such as insulting/swearing by self and pushing/slapping self or by partner (Harville et al. 2011). Furthermore, Harville et al. (2011) discovered that young, Black, non-educated individuals were more likely to experience more severe effects of the hurricane, supporting the discussion of unequal effects of Hurricane Katrina.

Discussion

Cultural Geographies of New Orleans and Environmental Racism

The unequal effects that Hurricane Katrina had on individuals of low socioeconomic status and Black communities took place in a particular cultural, political, and economic context with deep historical roots. Although the disparities sparked some shock throughout the nation, the broader assumptions and actions underpinning the extreme rift between white and Black, rich and poor New Orleanians in the wake of Hurricane Katrina have existed for centuries.

The settlement of New Orleans was originally situated on a natural 10-foot-high levee, created by river discharge from the Mississippi rivers inner bend (Morse 2008). This land was favourable to the white settlers as it was relatively dry compared to the surrounding swamps and marshes (Morse 2008). In 1719, New Orleans received the first of many ships containing slaves from Africa, which marked the start of over a century of overt slavery (Morse 2008).

New Orleans struggled during the beginning of the colonial era and received little attention from the governing Spanish and French colonial authorities, however the city dramatically changed during the turn of the 19th century (Morse 2008). The transition from the former colonial to the antebellum period was characterized in New Orleans by a shift to cotton and sugarcane plantations from tobacco and indigo farming (Campanella 2007). The agricultural change boosted the slave economy, and New Orleans became one of the most frequented slave markets in the South (Campanella 2007).

The political, social, and economic changes in New Orleans also sparked geographical changes to the city as well. Plantations were created along the natural levees of the Mississippi river, while domestic housing was pushed upriver, working-class situated closest to the river with wealthier homes occupying space further inland (Morse 2008). The African population of New Orleans at the time can roughly be categorized into two categories; Creole gens de couleur libre (free people of colour) and the enslaved (Morse 2008). The patterns of settlement were distinct between the two groups, with the enslaved population occupying the upper portion of the river, close to the homes of the white owners, while the Creole settled downriver which enabled them to exercise their free status, French language, and Caribbean culture (Morse 2008). The

domination of the upper river portion of New Orleans by Anglo-Americans and the concentration of Creole communities in the lower city has deeply influenced the cultural geography of the New Orleans we know today (Campanella 2007).

Another era which largely shaped the cultural geography of New Orleans was the American Civil War and the Reconstruction period following. The events leading up to and preceding the American Civil War have a long and complex history, however, the war was largely triggered by the election of Abraham Lincoln in 1860 who petitioned to abolish slavery entirely (McPherson n.d.). This sparked seven slave states in the deep South, including Louisiana, to create a new nation called "Confederate States of America", who fought against the Northern States between 1861 and 1865 (McPherson n.d.). In the end the Northern states who were loyal to the union and the United States constitution came out victorious, and the Reconstruction era began, which promised to enforce the civil rights of all Americans (McPherson n.d.). This was legally affirmed with the 13th, 14th, and 15th Amendments of the constitution (McPherson n.d.). The 13th amendment stated, "neither slavery nor involuntary servitude… shall exist within the United States, or any place subject to their jurisdiction" (U.S. Const. am. 13.). The 14th amendment states "No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States" (U.S. Const. am. 14.). Lastly, the 15th amendment stated, "The right of citizens of the United States to voter shall not be denied or abridged by the United States or by any State on the account of race, color, or previous condition of servitude" (U.S. Const. am. 15.).

Although the legal environment changed in regard to slave ownership and treatment of Black folks in the United States, Louisiana perpetuated racial discrimination in housing and individual rights which reflected the "classic southern" patterns of settlement (Morse 2008). For example, white folks designated undesirable areas of the city for Black folk. Some disadvantages included flooding, unhealthy air, noise, inadequate streets, inadequate access to water, and lack of basic infrastructure such as sewage (Morse 2008). In 1918, the New Orleans Dock Board started construction on a canal that would be used as a shortcut between the Mississippi river and the Gulf of Mexico called the Industrial Canal (Morse 2008). This project isolated the largely Black community of the Lower Ninth Ward from the rest of New Orleans and increased risk of flooding due to the inadequate levees built (Morse 2008). In 1937, the Housing Authority of New Orleans (HANO) built six housing projects that were racially segregated in compliance with the Jim Crow state and local laws of the era enforcing racial segregation in the South (Morse 2008). Two of the projects were designated for white folk and were built on a higher elevation closer to the front of the town, where there was adequate infrastructure, while four Black designated projects were built in low-elevation swamplands at the back of the town (Morse 2008).

The damages caused by Hurricane Katrina revealed and exacerbated these long-seated histories of environmental racism and injustice within New Orleans. On the morning of August 28, 2005 at about 7:30 a.m., the force of Hurricane Katrina levelled the levee walls on the west side of the Industrial canal causing major flooding in the Bywater and Treme (Boyd, Wolshon, and Van Heerden 2009). Both the Bywater and Treme area were communities made up of mostly Black individuals, of which a majority rented their homes. Furthermore, these were communities

plagued by severe poverty, estimated at 38.7% of the Baywater community and 56.9% of the Treme community (Logan 2006). Fifteen minutes after this, two sections of the east and south portions of the levee gave out, releasing a 14-foot wall of water onto the Lower Ninth Ward. Similar to the Baywater and Treme communities, the Lower Ninth was an Black community (95.7%) and 46.0% of individuals in this community were renters, with 34.4% of the community considered to be poor (Logan 2006). Over the next 24 hours, 80% of New Orleans was flooded due to Hurricane Katrina, with some parts of the city covered by 20 feet of water (Boyd, Wolshon, and Van Heerden 2009). However, the "White Teapot" portion of New Orleans which were historically used as colonial plantations, were relatively untouched since they were protected by the natural levees of the Mississippi river (Morse 2008). Some characteristics of these geographic areas compared to the areas that were hit hardest by Katrina include high elevation and low exposure to riverside or back-swamp inconveniences, they also had adequate public transportation and infrastructure. Furthermore, there were fewer Black residing in these neighbourhoods and the rate of poverty was significantly lower than the predominately Black communities. The desire to sequester bothersome infrastructure such as railways, Industrial canal, and the Interstate 10, as well as the overwhelmingly white control over New Orleans geography, heavily secluded predominately Black neighbourhoods such as Treme, Bywater, and the Lower Ninth Ward (Boyd, Wolshon, and Van Heerden 2009). This was catastrophic for the 105, 000 residents of the now-flooded Orleans Parish who lacked access to a vehicle or essential services (Boyd, Wolshon, and Van Heerden 2009). The overt discrimination did not stop when Hurricane Katrina passed; by September 8, 2005, over a week after Hurricane Katrina hit, 60% of Black residences remained flooded compared to only 24% of white residences (Boyd, Wolshon, and Van Heerden 2009).

Not only was flood patterning a reflection of the long-standing environmental racism, but contamination of the environment and air quality also emulated these patterns. For example, there was an overwhelming fear of "toxic gumbo" of contaminated floodwaters during the immediate aftermath of Katrina (Morse 2008). Sources of contamination that threatened to poison the 114 billion gallons of trapped water included decaying bodies, sewage, chemicals from damages properties and vehicles, as well as oil and gas from damaged pipes. The hazardous material sites in New Orleans are concentrated in the isolated predominately Black communities including the Lower Ninth Ward, Desire, and Holly Grove (Morse 2008).

> "The water had gotten real contaminated. It was to the point where when you walked through it or had to deal with it for any reason, it showed on the skin or you became sick. So my girlfriend across the street, her baby had broken out real bad from the water, and it got to the point where it was just unbearable. Once the water was going, it was just awful."- Denise (Alive in Truth n.d.)

Disposal of the 22 million tons of disaster garbage also posed an issue for the city of New Orleans (Morse 2008). In the 1980s some unlined landfills in New Orleans were discovered to have been leaching out contaminants into the community and were eventually closed for public health reasons (Morse 2008). In the aftermath of Hurricane Katrina some of these landfills were reopened to help with the influx of garbage. For example, the Gentilly landfill, which released arsenic, cadmium, chromium, and other metals into the environment was reopened (Morse 2008). This landfill lays northwest to two predominately Black communities, Read Boulevard West and Plum Orchard. Another problematic landfill called Chef Menteur Landfill, situated next to the predominately to the low income Black and Asian community of Bayou Sauvage National refuge was also opened (Morse 2008).

The air quality of New Orleans also became a concern when the hazardous contaminants started drying after floodwaters were removed and the burning of disaster debris became common practice (Morse 2008). These processes exposed Orleans residents to arsenic, lead, and particulate matter, all of which are dangerous to human health (Morse 2008). In the most heavily flooded areas, which were also predominately Black communities with high rates of poverty, many of the structures had to be demolished due to unsalvageable damage. A majority of these buildings (85%) contained asbestos materials that were essentially released into the community during destruction (Morse 2008). Molds and other fungi also posed a risk to the heavily flooded neighbourhoods during the demolition processes of flooded residences. This created what was known as the "Katrina cough", a pulmonary condition resulting from the fine contaminated dust circulating New Orleans for years after the storm (Adams, Hattum, and English 2009).

As discussed in the results, adverse hurricane experiences, such as witnessing the destruction of communities, can increase stress and daily hassles, which is known to increase IPV. Individuals who were more likely to experience these unimaginable ordeals were Black and of low socioeconomic status. The framework of the city of New Orleans was built upon institutionalized racism that perpetuated patterns of increased risk for these individuals, making them more likely to experience adverse hurricane conditions compared to wealthier white New Orleanians. The unequal burden of horrific hurricane risks ultimately increased factors associated with IPV such as stress and ability to make one's own decision, for Black and poor communities. The systematic processes which enabled the disproportionate hurricane harm, not only from witnessing the damage firsthand but also the continued exposure to environmental

contamination, is an example of structural violence, which is explored more thoroughly in the section below.

Hurricane Katrina, Structural Violence, and Stratified Reproduction

Structural violence is evident throughout the events leading up to, during, and after Hurricane Katrina. Similar to the concept of environmental racism, structural violence highlights systematic processes that are enacted to disempower certain communities, but further adds the layer of health impacts. Structural violence is especially obvious in the evacuation procedures and warnings, continual negligence on a state and federal level, and ultimately highlights differential support in community's reproductive health.

The first report that Hurricane Katrina may affect New Orleans was released to the public on Friday August 26th, 2005 through the National Hurricane Center, which indicated the city was on the perimeter of the "cone of uncertainty" (Boyd, Wolshon, and Van Heerden 2009). It was only a matter of hours until New Orleans was reported to be a direct target for Hurricane Katrina and Louisiana was in a state of emergency by 10:00 p.m. on Friday evening (Boyd, Wolshon, and Van Heerden 2009). Thirty-three hours after the state of emergency was announced, New Orleans Mayor, Ray Nagin, ordered a mandatory evacuation for the city, leaving only 19 hours before Katrina made evacuation no longer possible (Boyd, Wolshon, and Van Heerden 2009). It is estimated that over one million Americans evacuated at-risk areas of Southeast Louisiana in the days leading to Hurricane Katrina, however an estimated 130, 000 individuals did not evacuate (Boyd, Wolshon, and Van Heerden 2009). Of the individuals who stayed, approximately 65, 000 were stranded in flood waters (Boyd, Wolshon, and Van Heerden 2009).

There were some refuges set up for immediate protection form the storm, such as the Superdome and Convention Center in New Orleans, but many lacked essential long-term supplies (Boyd, Wolshon, and Van Heerden 2009).

According to a study conducted by Boyd, Hwolson, and Van Heerden (2009), 358, 484 individuals evacuated from Orleans Parish during the threat of Hurricane Katrina, most of them in privately owned vehicles. For those who did not own a vehicle or have access to one, riding out the storm was their only option due to structural inequalities embedded in their society. The American transportation model, in which 80% of funds go to highways and 20% is designated for public transportation, unfairly isolates racial minorities and the poor (Sanchez, Stolz, and Ma 2003). For example, favour of highway development over public transportation increases housing developments further away from the city center, intensifying residential segregation and income inequalities (Sanchez, Stolz, and Ma 2003). Investments in industrial transportation such as railways, which are embedded in predominately Black and poor neighbourhoods in New Orleans, have made it extremely difficult to own property due to increases of property value, resulting in further displacement (Sanchez, Stolz, and Ma 2003). The structural policies and priorities at the state and federal level in regard to transportation directly lead to preventable deaths in the wake of Hurricane Katrina. The vast income inequalities within New Orleans meant many individuals did not have the funds or access to leave the city when the evacuation became mandatory.

> "They didn't care about us. Because, like I said, they knew they have a lot of poor people like myself don't have no transportation, don't have no money. Well I have a car but it got under the water. Don't have no money to buy gas, don't have no money to buy food. Living from day to day. Like I said, it was thousands of people out there like that." - Antoinette (Alive in Truth n.d.)

> "So he didn't make it mandatory until the day before the storm. And I am poor. I don't have a lot of money, you know. I had an automobile- it wasn't a brand new automobile. I don't think I could've went too far with it, because [laughs] the tires been real bad. I didn't have enough money to gas it up because the day before the storm when he decided to make it mandatory, gas jumped from $2.59 to $3.10 a gallon! The gas stations was closing up, you had to wait in the line four or five blocks long to get gas, and even if I could have got it, I wouldn't have been able to get enough to gas up and go nowhere--my truck wasn't going to make it. So I had no other choice but to ride it out. " – Deborah (Alive in Truth n.d.)

> "So you basically had maybe thirty hours ahead of time in order to try to prepare for the hurricane. That was a problem. That was the main problem. More than that, by having that short amount of time, for the people who worked, if you got paid on a certain day, nine times out of ten you was broke. Because it was at the end of the month, everybody's just finished paying bills and you're kind of on the last of your money waiting for the new month to begin so you can receive more money. So a lot of people was kind of without options. It wasn't that a lot of people didn't take the heed on not leaving; a lot of people couldn't leave. That's why they had so many people still down there." – Richard (Alive in Truth n.d.)

> "I probably would have moved before the storm, right before, but I was pregnant with my baby. I have diabetes and I have asthma. A couple of things, so that took a toll with me plus, I just didn't have the transportation." – Anonymous (Henrici, Childers, and Shaw 2015)

Those that were trapped within the city required immediate evacuation, however this was complicated by the communication blackout in the city. The initial phase of search and rescue focused on extricating individuals from the flood waters to dry drop-off locations, however these locations only provided immediate relief and were overwhelmed due to shallow supplies of food, water, medical aid, and shelter (Boyd, Wolshon, and Van Heerden 2009). These individuals were eventually transported to the more permanent refuges such as the Superdome and Convention Center, but essential supplies depleted quickly, and these areas became just as dire as the drop-off locations.

> "I walked from water up to my neck to get to the Convention Center. Every day they was moving us around, go here, go there, the busses is gonna meet you here, meet you there. They was lying. There was never no busses, they was lying. They was just making us tired. The had us in there to kill us. I saw babies, two month old babies, piled up in the

> bathroom dead. People was screaming, "The water coming, the water coming." I saw a girl raped and her throat cut. The mens found the man that did that and cut his throat. He had come over from the Superdome where he was raping babies and started doing it there, so the mens hunted him down and they slit his throat. All this time the police locked us in there and pointed guns at us. They made us kneel and then lie face down while they held the guns over us. Kids was screaming and saying, "Mommy, why they doing this to us?" All the news was just watching. I'm on the news, I was screaming at the news, just begging, on my knees. Babies was dying and I couldn't help. Old people was falling down dead. We told the police babies was dying and they said "So what? What the fuck can we do? They're dead." The news got us out. Not the National Guard, not the Mayor, not Blanco, the news people is the only ones who got us out. Channel twenty-six got me out. They got me out in they helicopter. Channel 26. The rest of them was there to kill us. I died there, I died." – Antoinette (Alive in Truth n.d.)

> "I had one son was on dialysis. Every time he would go up to a policeman and ask him could he go get him to a hospital, there was nothing they could do for him, nothing. My poor son swell up like a balloon. One day we was sitting outside -I guess what we call home out on the street- he look at me at say "Mom, I'm tired, I can't take no more." He walked off and I've never seen him no more. I've never seen him again. Never seen him again. I'm assuming he walked off and they either shot him to death or he just walked off somewhere and died. You know." - Deborah (Alive in Truth n.d.)

> "They turned us around with guns. The army turned us around with guns. Policemen. And I realized then that they really was keeping us in there. And you want me to tell you the truth, my version of it? They tried to kill us. When you keep somebody on top of the Interstate for five days, with no food and water, that's killing people. And there ain't no ands, ifs, or buts about it, that was NOPD [New Orleans Police Department] killing people. Four people died around me. Four. Diabetes. I am a diabetic and I survived it, by the grace of God, but I survived it. But they had people who were worse off than me, so, and they didn't make it. Old people. One young woman couldn't survive it because of the dehydration. So I mean, this is what you call NOPD murder. Murder. That's what I call it. What else would you call it?" – Clarice B. (Alive in Truth n.d.)

The inequalities highlighted by structural violence also contributed to stratified reproduction, in which the reproductive lives and experiences of some residents were devalued. Pregnant women and those in the postpartum period require special health care needs, that are largely overlooked in the face of disaster (Jones-DeWeever 2008). The inability to access even the most basic resources during the lockdown of New Orleans immediately after Hurricane Katrina hit, lead to the preventable death and suffering of many Black and poor infants and

mothers. A pregnant Black mother named Anika Pugh who was evacuated from New Orleans after Hurricane Katrina highlights the disempowerment of her reproductive health (Penner 2011). Anika explained once she was evacuated to the Louisiana State University gymnasium "I couldn't even walk up straight… because the pain had just suddenly came down on me" (Penner 2011, 17). Her pleads for help went ignored by medical staff and she was sent away with a handful of vitamins and iron pills. She miscarried a week later. Anika further explained "I kind of have a feeling why my baby's gone, because its like I was stressing from the start of everything, wondering… how are we going to survive?" (Penner 2011, 17). Unfortunately, Anika's story was not an anomaly, but rather, the normal in the wake of Hurricane Katrina.

> "I've seen babies. I've seen women sit down and her baby died in her arms because they refused to take this baby, to get this baby some medicine, this baby had half a heart -- three months old. Baby turning purple, her lips, her hands, her feet turning purple. They refused to give the baby medical treatment. That child died in her mama's arms.
> I guess that's all I got to say. That's it. I think the government, everybody failed us."- Deborah (Alive in Truth n.d.)

> "Our neighborhood was neglected. I truly feel that the government is afraid of poor people, afraid of Black People and well, just didn't care. As far as my health went, I had to go to the hospital. I had a sickness similar to Cholera. I then had bleeding. So I didn't have a baby." - Jacquelyn Mang, (Hurricane Digital Memory Bank n.d.)

> "Babies was dying and I couldn't help. Old people was falling down dead. We told the police babies was dying and they said "So what? What the fuck can we do? They're dead." " – Antoinette (Alive in Truth n.d.)

The acute disregard for human life experienced by those individuals, mostly poor and Black, who could not or did not evacuate in time highlights the physical impact of social inequalities. However, the structural violence did not stop there, and the long-term lack of adequate support continued to physically harm and disempower the reproductive conditions of these individuals. Many Hurricane Katrina survivors that owned houses in New Orleans were able to return

within months of the storm, others having to wait a whole year (Adams, Hattum, and English 2009). However, for those who lived in public housing, rented homes, or low-income trailers, returning to their city and homes was less likely (Adams, Hattum, and English 2009). Sharonda, a pregnant mother of two who was displaced from her home in New Orleans, recounted the hardships of finding prenatal care, "every clinic I go to they say we don't do prenatal care and all this" (Voices of the Storm 2006, 33). The lived experiences quoted below further highlight the sufferings caused by displacement from people's homes and communities.

> "I had went to a [football] game with my mom, siblings and two of my cousins on Friday, September 16, 2005. I was walking around the game with a classmate when I saw a white officer pulling every black male teenager to the side. He would pin them to the chainlink fence and shine a light in their faces. I was disgusted with this and asked for his badge number and name. Then a white female in the crowd had asked why was the officer harassing the black boy and I simply responded by saying that it was because the boy is black. The officer handed the boy to another officer and approached me and got in my face. He asked if I was the one that said that and I said yes. He roughly grabbed me and tried to drag me out of the fence. I told him to unhand me and he said I called him a racist. I repeated what I said earlier and stated the fact that I had Freedom of Speech and he said not here. I told him I wasn't going anywhere without my mom knowing. He told me she'd find out. I refused to move so he dragged me further. I was trying to do anything to stop the officer from dragging me into the unlit, very dark area behind the stadium. It was isolated and filled with trees and I had heard of black people disappearing in Northern Louisiana and I did not want to be one of them. I saw my brother and yelled for him to go get my mother. A crowd had gathered and they were watching the officer drag me out the gate. Soon my mom arrived and asked what the problem was. After they exchanged words he put my mother out the game as well. Both of us vehemently protested because my siblings and cousins were still in the game. As we sat outside of the game waiting for them we talked about racism in Monroe and how I shouldn't have been touched or brought out of the game and how I hadn't done anything wrong. Then officer said he was arresting both of us and we resisted because we had done nothing wrong. My little sister became hysterical and the white woman was holding her. They tried handcuffing my mom who was pregnant at the time and she sat on the ground and refused. She started screaming because they were hurting her. Then I got upset because they had made her fall. I started to scream and fight the police officer and my cousin finally got my little sister. I stopped fighting since my sister was gone and let them handcuff me. They put me in a patrol car and started to sing gospel hymns and pray. I saw my uncle Daryll talking to one of the officers and they let me go. I saw my mom in a police car and asked her if

> she was ok. One of the officers got mad an put me back in the patrol car and drove me to a detention center. Once there I was booked and smiled on my mugshot and got my phone call so I called my Dad and my cousin at Aunt Michelle's house. They made me strip and searched me and gave me clothes to wear. Then I was brought to a room and given blankets and sheets. I didn't make up my bed I just sat on the sheets and sang. I finally dozed off and at 11:50 I was out. My Aunt had got my mom and I out. I hugged my mom and we went back to my house. After that incident there was tension in the house so my father came and got us on September 26, 2005. I was so glad to be back home in New Orleans all I could do was cry."- Theresa Perry (Hurricane Digital Memory Bank n.d.)

> "In, in Baker [the location of the emergency trailer park where Katrina survivors were provided shelter], [the crosses] was all over. Ah, Baker was the main headquarters of the Ku Klux Klan (...) This white man walked up and he said, ah, "If you all would've came here in the '60s, he said, I'm so glad you all didn't come", he said, "Oh, you all would've been dead." He said, "They would've killed you all." They put us in a pasture where the cows and the horses was living in. That's where the trailer was. And, believe it or not, they, they tried to put all the murders on New Orleans people. But when they found out it wasn't New Orleans people it was their own people and they did a lot of killing, themselves, in Baton Rouge. They was trying to put it on us but it wasn't us. And, but it's not everybody's opinion, but this is my opinion, Baton Rouge is not a place for people to live: none of us." – Anonymous (Henrici, Childers, and Shaw 2015)

As the amount of rentable housing plummeted due to storm damage, rent skyrocketed, making it almost impossible for low socioeconomic individuals to return to New Orleans (Adams, Hattum, and English 2009). Many of these individuals were forced to live in FEMA trailer park communities, exposing them to feelings of unsafety and potentially increased IPV.

> "Well, this disaster caused a lot of women who [had been] separated from their batterers to go back to their batterers because they lost their homes. They've got the children. They have no place else to go. So they went back to batterers. Okay now they're with their batterer in a much smaller place, what is it? Six by thirty? [referring to the dimensions of the typical FEMA trailer]." – Anonymous (Jones-DeWeever 2008)

The FEMA trailers were also reported to contain dangerous levels of formaldehyde, a dangerous cancer causing chemical (Adams, Hattum, and English 2009). Additionally, the rebuilding of New Orleans largely ignored voices of Black and poor individuals in regard to their communities. The resettlement and recovery programs initiated by government reflected the historical patterns of structural violence and environmental racism. Instead of rebuilding damaged houses in neighbourhoods such as New Orleans East, Lower Ninth Ward, and Hollygrove, proposals of creating green spaces instead surged, erasing these prominently Black communities (Ross and Ross 2008). This sparked intense lash back and New Orleans Mayor Ray Nagin quickly withdrew the proposal (Ross and Ross 2008).

> "OK you have generations of people that lived in these projects [public housing]. OK? And you want to tear these projects down. Which is all fine, and you want to make 'em better living conditions. Well, before you tear it down, please put me in another one. Then go tear it down and do what you want with 'em. But don't know 'em down and then these people want to come and have nowhere to go." - Substitute teacher living in a FEMA trailer community (Adams, Hattum, and English 2009)

Research also found that the chronic displacement of these communities also triggered more intense poverty and employment for individuals who did not return to New Orleans (Henrici, Childers, and Shaw 2015). This further highlights the post-Katrina realities that created an environment in which IPV was able to flourish, especially in historically vulnerable communities.

> "You want to have a purpose and a lot of times men become unhappy if they are not working. They feel emasculated because their wife or girlfriend is coming in and supporting him and everything and how else do you show you are not emasculated than hitting...being violent? Taking charge." - (405) (Ponder 2016)

> "So I mean, everything didn't get good, everything didn't get fine, because when you have anxiety levels that high, you start taking stress out on each other. So it was me and her doing a lot of arguing behind stupid stuff. Ain't nothing her fault, but her and me

> gonna fuss about it. She fussing at me about what's taking too long, I'm fussing at her about what's taking too long. We're getting on each other's nerves, and it wasn't because—we didn't have problems with each other, it was because of the anxiety. We had so much stress coming at us from different ways—she wondering where her children are at, me wondering where my momma and sister at, people looking for us, we looking for them. You know, how we gonna get this, how we gonna do this, because when we left, we didn't expect to evacuate for good. We thought it was gonna be a three-day ordeal. Ended up being forever." – Richard (Alive in Truth n.d.)

This structural violence leading to the suffering and death of Black and poor communities, through storm damage, inadequate emergency preparedness, and increased IPV, is part of a larger national system. The United States explicit disregard for climate change, and thus the human suffering associated with it, is evident in the withdrawal from the Paris Climate Agreement, Environmental Protection Agency climate change initiatives, and the reversal of Obama's publication "The President's Climate Action Plan" (Samet and Woodward 2018). The refusal to mitigate climate change, that is working to prevent threats, highlights the United States Governments direct hand in causing an unfair burden on individuals who cannot afford to or do not have access to, the resources needed to adapt to climate change threats. As seen in Hurricane Katrina this will lead to a continuation of systematically endorsed cycles of poverty and violence, producing preventable adversity of already vulnerable communities.

The Embodiment of Reproductive Injustice

The many tragedies that occurred during and after Hurricane Katrina in New Orleans were not unpredictable, and many of them could have been prevented through meaningful involvement from communities in disaster planning and adequate attention from the government. There were many unempowered individuals, such as those who did not have access to a private vehicle, that

were burdened with the incompetency of the institutions making decisions for citizens, however pregnant low income Black individuals were in a particularly unstable position.

The environmental racism and structural violence experienced by generations of low socioeconomic status individuals and Blacks in Louisiana have had a lasting impact on their bodies as well as the regulation of their reproductive health. Similar to the other conditions outlining the tragedies that occurred during Hurricane Katrina, IPV and reproductive injustices have deep historical roots. Specifically, women of colour were subjugated to cruel punishments throughout the colonial and antebellum period of the United States. For example, many enslaved Africans were often denied control over their reproductive decisions and forced to have children with one another based on their owners demands and benefit (Grady, Hinshaw-Fuselier, and Friar 2013). It is also estimated that approximately 58% of all enslaved women between the ages of 15-30 years old were sexually assaulted for the pleasure of white men or economic purposes (Prather et al. 2018). Furthermore, reproductive control was eliminated from enslaved African women as those who had preferable qualities such as strength were sold as “breeders” to birth more children into slavery (Prather et al. 2018). Subsequently, many of these women were forced to continue hard labour in the cotton and sugar plantations during pregnancy and immediately after childbirth, resulting in adverse reproductive health conditions such as infant mortality and fistulas, which is the abnormal connection between two organs (Grady, Hinshaw-Fuselier, and Friar 2013). Physical punishment was not dialed down due to pregnancy, and many underwent lashings in a “whipping hole”, which was dug out specifically for pregnant women’s bellies so they could lie on their stomachs (Grady, Hinshaw-Fuselier, and Friar 2013). Healthcare for enslaved individuals during this time in the South was also highly limited to abusive

experimentation such as James Marion Sims reproductive surgeries on non-anaesthetized Black women (Prather et al. 2018).

The Reconstruction and subsequent Jim Crow era provided little relief to the reproductive injustices experienced by Black folk in the South, even though legal enslavement was abolished. Multiple programs that violated basic reproductive rights flourished during this period including the eugenics movement which resulted in the non-consensual sterilization of thousands of Black (Grady, Hinshaw-Fuselier, and Friar 2013). Healthcare continued to be highly inadequate or non-existent for Black folks throughout this time as U.S. healthcare-imposed segregation until 1964 (Grady, Hinshaw-Fuselier, and Friar 2013). Generational poverty leading to lack of access of resources was also prominent during this time due to the rejection of Black folks in a dominantly white patriarchal society.

This historical context in which Black reproductive health is situated in emphasizes the importance of understanding that reproductive health does not just start at the time of conception to the event of birth, rather, it is a lifelong transgenerational affair. Research suggests that adult and generational health starts in the intrauterine environment and can be molded throughout early neonatal experiences as well as repetitive negative experiences in early adulthood. For example, the low birth weight patterns in Black infants today has been suggested to stem from the harsh conditions endured by enslaved African women (Grady, Hinshaw-Fuselier, and Friar 2013). Another research project conducted by Wells (2010) suggests that the poor nutritional experiences of those subjugated to colonial atrocities could be the origin point of health disparities regarding cardiovascular risk. Furthermore, these historical patterns of systematic

reproductive injustices have continued to support "the intergenerational transmission of poor sexual and reproductive health outcomes among Black women in the United States" (Prather et al. 2018, 252). To this day pregnancy and birth remains a disproportionately dangerous process for Black mothers in the United States. Black women may also be at a greater risk of intimate partner victimization due to perpetuated historical stereotypes (Grady, Hinshaw-Fuselier, and Friar 2013). Stereotypes of Black women, leading back to the antebellum period of the United States, include hyper-sexualization of their bodies, as many were seen as sexual objects for the slave owner to use, as well as strong heads of the household due to their domestic work (Grady, Hinshaw-Fuselier, and Friar 2013). If men invest into these stereotypes and experience discrepancy stress, this may contribute to the increased risk of victimization (Grady, Hinshaw-Fuselier, and Friar 2013).

Hurricane Katrina reinforced the long-standing reproductive injustices experienced by poor and Black women within the United States. The poor, Blacks, and women were institutionally tied to the unsafe environment of New Orleans as Hurricane Katrina ripped through. This trauma exemplified the lasting impressions of historical social disenfranchisement through which bodies are not only acutely harmed but embody the trauma extending transgenerationally. Results from this project highlight the exacerbation of potential IPV risk factors including low socioeconomic status, relationship status, social isolation, new geographic location, inadequate legal and social safety nets. The exacerbation of unsafe conditions due to systematic inequality directly violates a women's right to parent children in a safe and healthy environment. Additionally, the violence perpetuated by a partner may impede a woman's ability to have or not have children. The social inequalities leading to the increased adverse outcomes of Hurricane Katrina on Black and poor

communities are absorbed through the maternal body, potentially creating detrimental transgenerational effects on generations to come, continuing the cycle of discrimination and unequal suffering.

Strategies for Change

The discussion above highlights the systematic inequalities exposed by Hurricane Katrina that lead to increased IPV and reproductive harm within disenfranchised communities in New Orleans. The everyday discriminations experienced by Black and poor individuals perpetuate a system that values white affluent dominance. As the reproductive justice framework suggests, there needs to be recognition and exploration into the gendered, sexualized, and racialized power systems used to perpetuate the broken system (Sister Song n.d.). This first step is essential in understanding the nuanced dynamics of discrimination in order to effectively inform policy. This research project focused on the specific demographic of pregnant, poor, and Black individuals in the natural disaster context of New Orleans. Further research is required in understanding the discriminatory subtleties of other systematically at-risk groups such as the LGBTQ2+ community, Indigenous communities, and other racial minorities. Both IPV and natural disasters are powerful forces that know no bounds in regard to race, sexuality, gender, or economic status. However, as discussed throughout this essay, there are systematically enforced factors that lead to the disempowerment of certain communities and subsequent increased chances of harm. This highlights the need for an emic perspective on the historical, political, economic, and cultural contexts in which certain groups are located. This leads me to my two recommendation for strategies of change; increased representation and economic empowerment.

Women, people of colour, and low socioeconomic individuals have been historically left out of important decisions regarding their own communities and bodies. It is time to uplift these voices and incorporate them into the political and economic realm in order to represent their specific needs and wants. Representation of these individuals in creating disaster, IPV, and reproductive protocols would greatly improve the effectiveness of these programs due to specific community knowledge as well as begin to subvert patriarchal values of white male voices. The intentional omission of Black and women's voices reduces the urgency and empathy surrounding the issues of IPV and subsequent reproductive harm. In order to create platforms in which these voices are valued and respected, there must be an increase of social opportunities, specifically targeted at empowering the independence of these individuals.

Economic empowerment is essential to empowering the agency as well as increasing accessibility to the services these individuals require. The prevalence of economic reliance on male partners and low socioeconomic status in partnerships dealing with IPV highlights the importance of a woman's ability to choose from a variety of economic and employment options. This includes targeting the significant gender wage gap prevalent in New Orleans, evident in the fact that Black women in 2013 earned 76 cents on every dollar a white man made (Ponder 2016). Furthermore, accessibility to formal schooling may act as a foundation in the ability to exercise agency in determining a career path, which would include the implementation of extensive childcare, housing, funding opportunities, and adequate legal protections. The educational opportunities must be additionally supported by enforced anti-discrimination laws within non-traditional female areas of employment in order to integrate new economic opportunities.

Conclusion

This essay demonstrated the direct interconnection between structural violence, IPV, and reproductive harm within a natural disaster context. Not only did Hurricane Katrina reinforce the historically institutionalized inequalities by increasing unemployment, poverty, homelessness, and preventable death in Black and poor communities, but further perpetuated patterns of health inequalities. The pregnant individuals who experienced New Orleans during and directly after the hurricane, a majority of whom were Black or poor, underwent severe distress, which had adverse implications on their health as well as their fetus's immediate and long-term health. Furthermore, the increased economic, social, and political stress caused by the hurricane directly impacted factors associated with IPV, causing additional harm to maternal and fetal health. The populational health disparities seen between affluent and/or white individuals and poor and/or Black are direct consequences of the sociocultural environments which empowers one and disempowers the other. The lived experiences of Black mothers who endured Hurricane Katrina and IPV will likely become embodied transgenerationally, perpetuating the systematic cycles of violence and adverse health.

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