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**A SYSTEMATIC REVIEW OF SEXUAL VIOLENCE AND HIV IN THE
POST-DISASTER CONTEXT: LATIN AMERICA AND THE CARIBBEAN**

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In partial fulfillment of the requirements
For the degree of Master of Public Health

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A SYSTEMATIC REVIEW OF SEXUAL VIOLENCE AND HIV IN THE POST-DISASTER CONTEXT: LATIN AMERICA AND THE CARIBBEAN

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ABSTRACT

INTRODUCTION: In the last decade, over 800 disasters struck Latin America and the Caribbean, cumulatively affecting an estimated 64 million people. Three quarters of the region's population lives in disaster risk areas. There is widespread consensus that sexual violence increases in the aftermath of disasters, however historically its prevention has not been prioritized, and in general it remains a vastly understudied phenomenon at the intersection of health and human rights. The linkage between sexual violence and Human Immunodeficiency Virus (HIV) in the post-disaster context is similarly unrepresented in the literature.

OBJECTIVES: This systematic review aims to assess the extent to which sexual violence in the post-disaster context has been studied in the region of Latin America and the Caribbean. The primary objectives of the review include (1) to identify and assess the quality of existing literature on sexual violence in the post-disaster context in Latin America and the Caribbean; (2) to assess whether ostensible increases in incidence of sexual violence and HIV infection in the post-disaster context are supported by the existing literature; and (3) to describe contextual factors of the post-disaster context that exacerbate sexual violence vulnerabilities.

METHODS: A systematic review of the literature was conducted by searching PubMed, Ovid Global Health, Web of Science and LILACS databases for relevant publications on sexual violence in post-disaster Latin America and the Caribbean (n=147). Exclusion criteria were applied and 10 articles investigating the 2010 earthquake in Haiti (n=7), the 2007 earthquake in Peru (n=1), Hurricane Noel (2007) in the Dominican Republic (n=1), and Hurricane Mitch (1998) in Honduras and Nicaragua (n=1) were ultimately reviewed.

RESULTS: The results of this systematic review indicate that sexual violence increases in the aftermath of natural disasters and that women and girls are the most vulnerable populations. Sexual violence may also increase risk of HIV, however there is insufficient evidence to support an association between sexual violence and HIV at the population level. Structural and social factors, most notably gender inequality, exacerbate sexual violence vulnerabilities in the post-disaster context.

CONCLUSIONS: There is an urgent need for additional research investigating sexual violence in the global post-disaster context in order to inform prevention efforts and disaster preparedness and to uphold human rights.

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INTRODUCTION

Natural Disasters in Latin America and the Caribbean

There were nearly 7,000 natural disasters worldwide recorded by the Emergency Events Database of the Center for Research on the Epidemiology of Disasters (CREED) from 1994 to 2013.³ These disasters claimed an estimated 1.35 million lives and affected 218 million people on average per year.³ The frequency and magnitude of impact of natural disasters and resulting humanitarian crises have increased substantially in recent years.⁴ Leaning and Guha-Sapir (2015) attribute 80% of the increase to climate-related events and warn that the frequency and severity of floods and storms in particular will rise with continued climate change.⁵

The region of Latin America and the Caribbean is particularly vulnerable to geophysical disasters including volcanic eruptions and earthquakes, and also droughts and floods related to the El Niño phenomenon and cyclic tropical storming “widely believed to have intensified with global warming.”⁶ The United Nations Population Fund estimates that 75% of the population in Latin America and the Caribbean lives in disaster risk areas.¹ In the last decade, the region has suffered more than 800 disasters that cumulatively affected an estimated 64 million people.¹ Most recently, Muisne, Ecuador, was struck by a magnitude 7.8 earthquake on April 18, 2016.⁷ The death toll has risen to more than 650 fatalities, and it is estimated that over 26,000 people have been displaced and are now living in shelters across the country.⁷

Natural Disasters and Sexual Violence

Natural disasters create social vulnerabilities, and can “render individuals and groups vulnerable to human rights violations or may exacerbate [existing] vulnerabilities.”¹ There is widespread consensus that sexual violence, in its multitude of manifestations, increases in the aftermath of disaster and the humanitarian crises that ensue.^{1,8-10} The prevention of sexual violence and the promotion of reproductive health have historically not been prioritized in humanitarian settings,^{1,11,12} and sexual violence in general remains a vastly understudied phenomenon at the intersection of health and human rights. *Figure 1* depicts seven of the most impactful natural disasters to strike Latin America and the Caribbean in recent years, in terms of the number of people affected, total deaths, and economic loss. Statistics from the United Nations Population Fund paint a horrifying picture – almost 65,000 women are estimated to have been raped in the contexts shown on the map.¹³

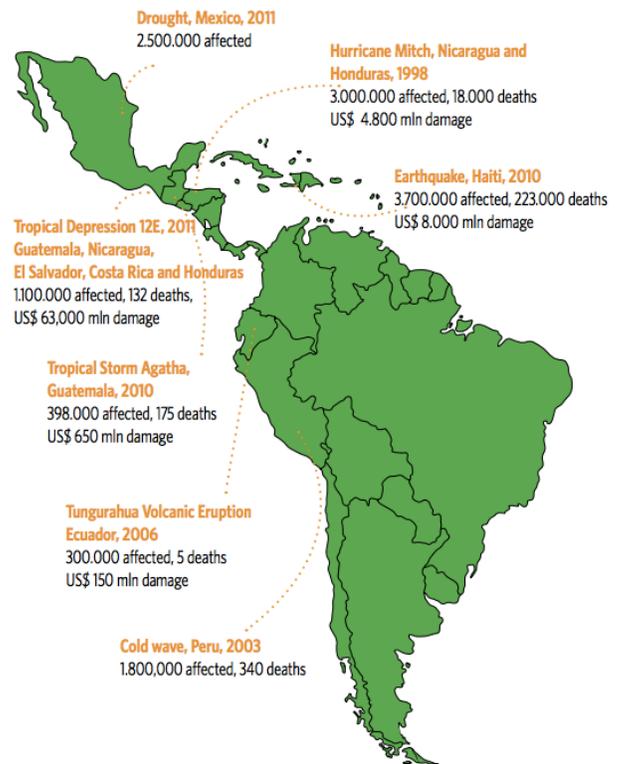


Figure 1 Recent Natural Disasters in Latin America and the Caribbean. Image reproduced from the United Nations Population Fund Report, *Gender-Based Violence and Natural Disasters in Latin America and the Caribbean*¹

Definition of Sexual Violence

According to the World Health Organization (WHO), sexual violence “encompasses acts that range from verbal harassment to forced penetration, and an array of types of coercion, from social pressure and intimidation to physical force.”¹⁴

The WHO defines sexual violence as:

“Any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic or otherwise directed against a person’s sexuality using coercion, by any person regardless of their relationship to the victim, in any setting, including but not limited to home and work.”²

For the purposes of this review, sexual violence was defined according to the parameters outlined in the WHO’s definition. *Figure 2* describes what the WHO considers to be the predominant forms of sexual violence and the contexts in which violence can occur. These forms and contexts informed the framework of the search strategy and the development of inclusion criteria for the review.

Forms and Contexts of Sexual Violence
Rape within marriage or dating relationships
Rape by strangers
Systematic rape during armed conflict
Unwanted sexual advances or sexual harassment, including demanding sex in return for favors
Sexual abuse of mentally or physically disabled people
Sexual abuse of children
Forced marriage or cohabitation, including the marriage of children
Denial of the right to use contraception or to adopt other measures to protect against sexual transmitted diseases
Forced abortion
Violent acts against the sexual integrity of women, including female genital mutilation and obligatory inspections for virginity
Forced prostitution and trafficking of people for the purpose of sexual exploitation

Figure 2 Forms and Contexts of Sexual Violence
Chart content reproduced from *WHO Global Campaign for Violence and Injury Prevention – Chapter 6, Sexual Violence*²

Sexual Violence and HIV

The linkage between sexual violence and Human Immunodeficiency Virus (HIV) in the post-disaster context is similarly unrepresented in the literature. However, in the words of Austin et al. (2008), “traditional wisdom has suggested that the conditions of deprivation experienced by displaced populations...together with sexual violence, provide fertile ground for the spread of infectious diseases, including HIV/AIDS.”¹⁵ A substantial amount of research has investigated the deleterious effects of disasters and displacement on HIV risk, HIV prevalence, and challenges of treatment and prevention, however HIV risk in the post-disaster context with sexual violence as a mediating factor has not been broadly considered or well documented.¹⁶⁻²⁰

There is some contention among researchers who have studied conflict and post-conflict settings about whether there is a true association between sexual violence and heightened HIV incidence.²¹⁻²⁵ Anema et al. (2008) modeled scenarios of widespread rape and evaluated the potential impact on HIV prevalence in seven African countries, and found that even in “the most extreme situations, where 15% of the female population was raped, where HIV prevalence among assailants was 8 times the average high rate [prevalence in the general population], widespread rape increased the absolute HIV prevalence of these countries by only 0.023%.”²¹ Paul Spiegel, former United Nations High Commissioner for Refugees, underscored these results

in a 2004 paper, stating, “The common assumption that this vulnerability necessarily translates into more HIV infections and consequently fuels the HIV/AIDS epidemic is not supported by data.” Watts et al. (2010) issued a similar statement, “Despite reports of rape-related incidents of HIV infection, ecological analyses have found no association between SV [sexual violence] and HIV at a population level.”²³ At the individual level, however, the modeling analysis conducted by Watts et al. (2010) suggested that sexual violence could “increase HIV incidence by 10% if rape is widespread,” and that “genital injury increases HIV transmission (threefold or more).”²³

The research seems to suggest that in conflict and post-conflict settings, at the population level, sexual violence is not significantly associated with increased HIV incidence, but at the individual level, sexual violence is a strong risk factor for HIV acquisition. Anema et al. (2008) stressed the importance of proper care and treatment for survivors of sexual violence, “regardless of the epidemiological effects of HIV transmission at the population level.”²¹ Indeed, HIV infection on an individual basis is a reality of sexual violence, exacerbated by barriers to healthcare access, lack of availability of HIV prophylaxis medications, and stigma, and HIV is only one of the devastating outcomes that can result from sexual violence.^{20,26-28}

OBJECTIVES

Few studies have examined sexual violence in the aftermath of natural disasters.^{1,29} The systematic review data screening process for this paper revealed that the majority of published literature on sexual violence in the post-disaster context has thus far focused on post-conflict displacement and humanitarian crises resulting from war, genocide, and persecution on the African continent.^{19,30-34} Fewer studies still have gone beyond documenting increased incidence of sexual violence in the post-disaster context to look at broader implications for public health and humanitarian relief efforts, including combatting the spread of sexually transmitted infectious diseases. This systematic review aims to assess the extent to which sexual violence in the post-disaster context has been studied in the region of Latin America and the Caribbean. The primary objectives of the review are as follows: (1) to identify and assess the quality of existing literature on sexual violence in the post-disaster context in Latin America and the Caribbean; (2) to assess whether ostensible increases in incidence of sexual violence and HIV infection in the post-disaster context are supported by the existing literature; and (3) to describe contextual factors of the post-disaster context that exacerbate sexual violence vulnerabilities.

METHODS

Search Strategy

This systematic review adheres to the Preferred Reporting Items for Systematic Reviews (PRISMA) statement.³⁵ Four core themes structured the inclusion criteria: sexual violence, natural disasters, displacement, and HIV. The articles selected for final review had to address all four of the thematic areas outlined in *Table 1* to be accepted. The specific search terms were generated by the author through a preliminary review of the literature on sexual violence in the post-disaster context, and through a review of medical subject heading terms (MeSH), controlled vocabularies and key words from relevant articles discovered during preliminary searches in PubMed and Ovid Global Health. *Appendix 1* details the search strategies employed for each of the databases.

TABLE 1 Search Terminology Used in Systematic Review by Core Theme

Sexual Violence	Natural Disasters	Displacement	HIV
Sex Offenses	Disaster	Emergency	HIV/AIDS
Sexual Abuse	Earthquake	Refugee Camp	HIV prevalence
Sexual Child Abuse	Tropical Storm	Refugee	HIV incidence
Human Trafficking	Flood	Evacuation	HIV epidemiology
Sex Trafficking	Drought	Evacuee	HIV prevention
Intimate Partner Violence	Avalanche	Humanitarian Setting	Human Immunodeficiency Virus
Rape	Tsunami	Humanitarian Crisis	HIV infection
Forced Sex	Hurricane	Internal Displacement	Sexually transmitted disease/infection
Domestic Abuse	Landslide		
Sexual Assault	Volcanic Eruption		
Gender-based Violence	Geological Processes		

Data Sources and Inclusion Criteria

The electronic databases Ovid Global Health, PubMed, Web of Science and LILACS (Latin American and Caribbean Center on Health Sciences Information) were searched from February to April 2016, according to the search terminology outlined in *Table 1* and *Appendix 1*, for all relevant published material. All returned citations were downloaded into an EndNote library (v.X7) for the data screening process. Articles were initially selected on the basis of the search terms related to sexual violence, natural disasters, displacement, and HIV. The titles and abstracts were reviewed to determine whether the article content was substantive in terms of the primary outcome of interest, sexual violence in the post-disaster context. Inclusion and exclusion criteria, presented in *Table 2*, were applied during the title and abstract review process. Articles that investigated populations displaced for reasons other than natural disasters were excluded, as were articles that studied populations or geographic regions outside of Latin America and the Caribbean. Conference proceedings, committee reports, book chapters, commentaries and perspectives were also excluded. No study types or designs were formally excluded. Articles

published in languages other than English or Spanish were also excluded from the review. Full text reviews were conducted and the inclusion and exclusion criteria were re-applied to select the final articles for inclusion.

TABLE 2 Inclusion and Exclusion Criteria

Category	Included	Excluded
Setting of interest	Latin America and the Caribbean (Region as defined by the World Bank) ³⁶	Studies that exclusively investigated countries or regions outside of Latin America and the Caribbean
Population of interest	Natural disaster-affected, displaced populations	Studies on war and conflict-affected displaced populations, studies on non-displaced populations
Outcome of interest	Sexual violence (i.e. rape, sexual assault, sexual abuse, intimate partner violence, sex trafficking, and other forms)	Studies on other types of violence or focused primarily on other outcomes of natural disasters
Publication Types	Articles published in peer-reviewed journals, reports published by governmental and non-governmental organizations, working papers	Conference proceedings, committee reports, book chapters, commentaries and perspectives
Research Designs	Qualitative, quantitative and mixed-methods research, reviews	No study types or designs were formally excluded from the search
Language	English and Spanish	Other Languages

Quality Assessment

Given the variety of methods employed in the included publications, the Mixed Methods Appraisal Tool, “designed for the appraisal stage of complex systematic literature reviews that include qualitative, quantitative and mixed methods studies,”³⁷ was utilized to assess methodological quality. For each study, a score indicating the number of criteria met (0-4) is given for qualitative components (QUAL), quantitative components (QUAN), or mixed methods components (MM), where applicable. Inter-rater reliability could not be assessed given the sole authorship of this review, and this is a limitation of the review. *Appendix 2* contains a table detailing the MMAT criteria and template utilized for quality assessment. Only one study by Kolbe et al. (2010)³⁸ met all four criteria of the Mixed Methods Appraisal Tool for quantitative studies. The qualitative studies commonly did not adequately consider how findings might have been related to the researchers’ influence (i.e. through interactions with participants and influence at all stages). This would have been especially important to consider given the highly

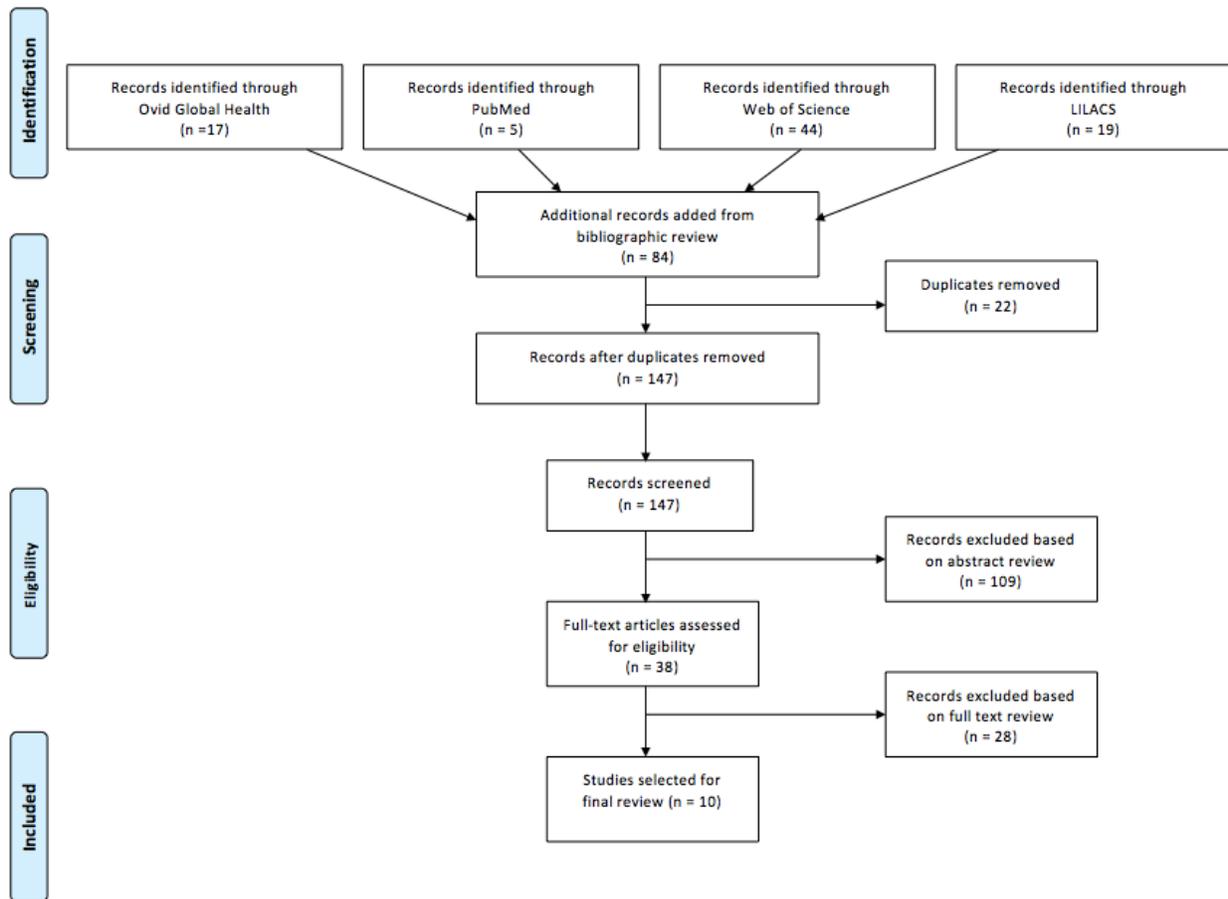
sensitive and often stigmatized nature of sexual violence. Additionally, several studies did not adequately consider the settings in which data were collected and the ways in which characteristics of these settings may have led to lack of disclosure of experiences of sexual violence.

There was also high potential for bias in several of the study designs, particularly in the qualitative studies that utilized focus groups for data collection. D'Adesky et al. (2012) note that participatory research designs may be subject to bias because "violence survivors may not be able to separate their experience from another person's."³⁹ D'Adesky et al. (2012) also raised concerns that social workers and sexual violence counselors may not be able to remain neutral in a study setting, and may "over-identify with subjects, or have an emotional reaction during an interview."³⁹ Additionally, all of the studies utilized self-report measures, often relying on anecdotal evidence whether in surveys, interviews or focus groups, and self-reported data may be subject to significant recall bias.⁴⁰

RESULTS

The initial searches of Ovid Global Health, PubMed, Web of Science and LILACS resulted in a total of 85 articles. An additional 84 articles were discovered through bibliographic review and citation analysis. After duplicate removal, 147 articles remained and after abstract review, 109 additional articles were removed. Thirty-eight full text articles were assessed for eligibility, leading to the exclusion of 28 articles. Ten articles met the final criteria for inclusion. *Figure 3* outlines the data screening and selection process.

FIGURE 3 PRISMA Flow Chart of Screening Process

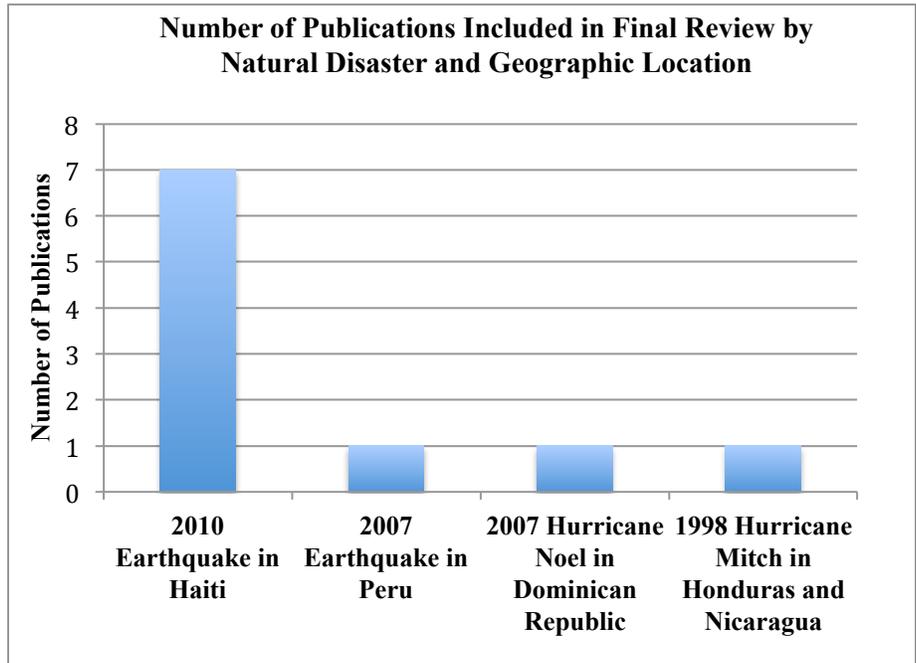


Main Findings

Of the 10 publications included in the final review, the majority investigated the 2010 earthquake in Haiti (n=7).^{11,26,27,38,39,41,42}

The other three papers studied the 2007 earthquake in Peru (n=1),⁴³ Hurricane Noel (2007) in the Dominican Republic (n=1),⁴⁴ and Hurricane Mitch (1998) in Honduras and Nicaragua (n=1).⁴⁵

Figure 4 shows the distribution of publications by natural disaster and geographic location. Figure 5 shows the distribution of



study locations within Latin America and the Caribbean. Four of the studies were qualitative in nature, utilizing structured interviews, focus groups and testimonies to assess experiences of sexual violence.^{11,26,41,43} One study was a review paper of intervencions for HIV prevention and additionally utilized qualitative methods to explore non-partner sexual violence in urban Haiti.²⁷ Two studies utilized quantitative methods – one compared results of a household survey to 2009 baseline data,³⁸ and the other used household surveys in four camps for internally displaced persons and a systematic modeling approach.⁴² Two studies utilized a mixed methods approach, combining qualitative and quantitative research designs,^{39,44} and one was a report that used a gender lens to comparatively analyze and examine secondary data to assess social variables before, during and after Hurrucane Mitch in Honduras and Nicaragua.⁴⁵

Figure 4 Graph of publications included in the final review by natural disaster and geographic location



Figure 5 Map of geographic distribution of study settings

The results of the 10 publications selected for the final review have been summarized and organized in *Table 3*. Descriptive overviews of methods and main findings of each of the publications are organized by natural disaster and geographic region.

TABLE 3 Results of Systematic Review

Study	Setting	Natural Disaster	Methods	Study Provided Evidence of Increased Sexual Violence in the Post-Disaster Context	Study Provided Evidence Supporting Association Between Sexual Violence and Increased HIV Risk	Main Findings	Quality Assessment [Mixed Methods Appraisal Tool] Criteria met: [0-4]
Alba and Luciano (2008)	Dominican Republic	Hurricane Noel (2007)	Mixed Methods – Qualitative/Quantitative Descriptive Study and Report Interviews of key informants (representatives from governmental organizations, NGOs and community-based groups (n=100) and interviews with a sample of individuals from vulnerable populations including children (n=20), adolescents and young people (n=35), women of reproductive age (n=50), women living with HIV (n=13), seniors (n=34) and persons with disabilities (n=10)	Yes	Yes	High risk of sexual violence, including exploitation and abuse and of unwanted pregnancy and HIV after natural disasters; children were identified as the population most affected by the hurricane, and are particularly vulnerable to sexual violence in shelters	QUAL 3
Davis and Bookey (2011)	Haiti	Earthquake (2010)	Qualitative Interviews with rape survivors (n=75, ages 5-65)	Yes	Yes	High rates of sexual violence against displaced women and children persist; many survivors had lost family members; few had received medical exams; some clinics did not offer HIV prophylaxis or emergency contraception	QUAL 2
d’Adesky and PotoFanm+Fi (2012)	Haiti	Earthquake (2010)	Mixed Methods – Qualitative/ Quantitative; Structured interviews, surveys and reports from frontline providers (n=60); Field study and surveys of pregnant adolescent girls (n=2,000)	Yes	Yes	64% of girls surveyed were pregnant from rape; 37% engaged in transactional sex; 92% felt sexual violence was more common since the earthquake	QUAL 3 QUAN 3 MM 2
Kolbe et al. (2010)	Haiti	Earthquake (2010)	Quantitative – 2009 baseline survey of mortality, injury, victimization, food security compared to data from 2010 survey of the same households (n=1,800); used complex samples procedure and adjusted for cluster effects	Yes	No (STDs only listed as a medical problem affecting 0.9% of those interviewed)	Estimated that over 10,000 people (10,813, 95% CI 6,726-14,900) were sexually assaulted during the six-week time period after the earthquake; majority female	QUAN 4
Joshi et al. (2014)	Haiti	Earthquake (2010)	Qualitative – exploratory sequential design; Grounded Theory 4 focus groups: healthcare providers (n=3, n=8); community advocates (n=8); victims (n=8)	Yes	No (STDs in general, HIV not specifically mentioned)	Earthquake “interacted syndemically with structural factors,” increasing sexual violence and HIV risk; purposeful injury to genitalia signaled STI/HIV risk among victims interviewed; language of sexual violence and within-culture differences can inform better health care and interventions	QUAL 3

Table 3 Continued on p. 12

TABLE 3 Results of Systematic Review (continued)

Study	Setting	Natural Disaster	Methods	Study Provided Evidence of Increased Sexual Violence in the Post-Disaster Context	Study Provided Evidence Supporting Association Between Sexual Violence and Increased HIV Risk	Main Findings	Quality Assessment [Mixed Methods Appraisal Tool] Criteria met: [0-4]
Logie and Daniel (2016)	Haiti	Earthquake (2010)	Qualitative – guided by critical ethnography; qualitative findings from a non-randomized cohort HIV prevention pilot study Women Participating in Famn an Aksyon Pou Sante Yo HIV Intervention (n=40); In depth individual interviews with Peer Health Educators (n=7)	Yes	Yes	Internally displaced women experience heightened vulnerability to intimate partner violence (IPV); agency is a multi-level, non-linear, incremental process; structural contexts of gender inequity and poverty must be addressed to reduce IPV	QUAL 3
Rahill et al. (2016)	Haiti	Earthquake (2010)	Review of CDC’s evidence-based interventions for HIV (103 total interventions); Qualitative research exploring non-partner sexual violence in urban Haiti, 2 focus groups (n=16), composed of women who had been gang raped, aged 19-52 years	Yes	Yes	Relative influence of sexual violence on HIV infection for Haitian women “remains obscure.” Women endured “intentionally injurious assaults by multiple perpetrators, all but one woman became pregnant	QUAL 2
Satterthwaite et al., CHRGI (2011)	Haiti	Earthquake (2010)	Quantitative – survey of households in 4 camps (n=365); modified systematic sampling approach	Yes	No	14% of survey respondents reported that 1 or more members of their household had experienced rape or unwanted touching; 9% reported that 1 or more household members had been raped or forced into having sex; 86% of victims were women and girls, most were in their early 20s.	QUAN 3
Delaney and Shrader (2000)	Honduras Nicaragua	Hurricane Mitch (1998)	Report: using a gender lens to comparatively analyze and examine social variables before, during and after the hurricane; synthesis and interpretation of secondary data	Yes	No	Sexual violence increases during the emergency and rehabilitation phases of disaster; gender-based analyses in relief planning efforts could aid in prevention of sexual violence and STDs	QUAL 1
Ojeda Parra (2008)	Peru	Earthquake (2007)	Qualitative - Testimonies from indirect witnesses and victims of sexual violence (n=3 health care professionals, 2 physicians and 1 psychologist; n=2 victims of sexual violence)	Yes	Yes	Sexual violence is primarily aimed at young women and girls; forced sex increases risk of exposure to HIV; factors including stigma and lack of parental support reduce access to needed health care and HIV prophylaxis after rape	QUAL 2

Descriptive Overview of Included Studies

2010 Earthquake in Haiti

All seven of the publications that investigated sexual violence in the aftermath of the 2010 earthquake in Haiti documented increases in violence, including rape, gang rape, sexual assault, intentionally injurious assault, unwanted touching, child sexual abuse, and intimate partner violence.

Kolbe et al. (2010) surveyed 1,800 households in metropolitan Port-au-Prince, Haiti, on mortality, injuries, victimization, food security and living arrangements post-earthquake, and compared the collected data to an original 2009 survey of the same households. The authors estimated that over 10,000 people (10,813, 95% CI 6,726-14,900) in Port-au-Prince were sexually assaulted during the six-week time period after the earthquake. The authors also found that sexual violence almost exclusively affected women and girls, with almost half of assaults affecting girls under 18 years of age, and nearly 3,000 assaults occurring in children under the age of 12.

A later household survey conducted in 2011 by the Center for Human Rights and Global Justice of the New York University School of Law in four camps for internally displaced persons in Haiti after the earthquake also aimed to assess reported incidents of sexual violence.⁴² The survey revealed a shocking statistic that one or more members of a household had been victimized by rape, unwanted touching or both in 14% of those surveyed.⁴² The vast majority of reported victims were girls and women (86%), and 72% of female respondents expressed “increased worry” about sexual violence since the earthquake, compared to 61% of male respondents.⁴²

The 2012 report, “Beyond Shock: Charting the Landscape of Sexual Violence in Post-Quake Haiti” by d’Adesky and PotoFanm+Fi, a non-profit solidarity coalition supporting the rights, voices and role of women and girls in rebuilding post-earthquake Haiti, details the qualitative and quantitative research that has been conducted on sexual violence in the aftermath of the 2010 earthquake in Haiti.³⁹ The document reported the results of a 2012 field survey of 2000 pregnant adolescent girls, which found that 64% of the girls surveyed were pregnant as a result of rape, and 37% reported having engaged in transactional or survival sex.³⁹ Additionally, the investigators found that 92% of the girls surveyed felt that sexual violence/forced sex was more common since the earthquake, and 94% said they were more afraid of sexual violence.³⁹ The study also documented an increase in early pregnancy among girls under the age of twenty and a strong correlation between sexual violence and early pregnancy.³⁹ The authors of the report raised concerns about exposures to HIV through rape (especially gang rape), child abuse and survival sex practices, and identified understanding the impact of sexual violence on the acquisition of sexually transmitted diseases as a research gap that should be prioritized.³⁹

Rahill et al. (2016) raised similar concerns about HIV exposure through rape. The authors reviewed features of the Center for Disease Control and Prevention’s evidence-based interventions for HIV to identify strategies with the potential to prevent HIV infections as a result of sexual violence.²⁷ The study investigated non-partner sexual violence in urban Haiti through qualitative research with two focus groups of women who had been gang raped.²⁷ The authors found that many of the women participating in the study had endured “intentionally injurious assaults by multiple perpetrators” and all but one of the women had become pregnant as a result of the assault.²⁷ The implications of these findings are that in addition to having

unwanted pregnancies, the women's vaginal injuries had also placed them at increased risk of sexually transmitted infections, including HIV/AIDS.²⁷ Only one of the women had been tested for HIV and knew her status.²⁷

Joshi et al. (2014) also documented the infliction of intentionally injurious genital injuries among victims of sexual violence in their investigation of a crucial component of both research and health communications around sexual violence – language.²⁶ Joshi et al. (2014) documented within-culture differences in both the language used to describe sexual violence and to communicate health effects of it.²⁶ The investigators ran four focus groups composed of health care providers, community advocates and victims of sexual violence and utilized “exploratory sequential qualitative design and Grounded Theory” to study language and terminology utilized when speaking about sexual violence.²⁶ The authors found that there were striking differences between the words and phrasing employed by health care workers compared to victims.²⁶ These differences in semantics have practical implications in that they could inform best practices for screening and identifying patients who have experienced sexual violence. This research also suggests that a lack of nuanced and culturally informed communication around sexual violence on the part of health care workers may deter patients from reporting and may be a barrier to receiving needed care. The authors also documented purposeful genital injuries that had been inflicted on victims interviewed and increased HIV risk from the injuries, as well as pregnancies resulting from rape.²⁶

Logie and Daniels (2016) investigated vulnerability to intimate partner violence among internally displaced women in Haiti as a result of poverty and disrupted community networks.⁴¹ Interviews with women participating in a non-randomized cohort HIV prevention pilot study revealed multiple forms of intimate partner violence, including sexual violence, and how both sexual violence and gender disparities in terms of power to negotiate safer sex practices such as condom use, can place women at high risk for HIV and other sexually transmitted infections.⁴¹ The authors assert that intimate partner violence is “one form of structural violence that is connected to larger gender norms and poverty,” and that interventions are needed to combat structural factors that silence and constrain women's agency to ultimately promote gender equity and address intimate partner violence among internally displaced women.⁴¹

Davis and Bookey (2011) emphasized a rights-based approach to understanding and combating sexual violence. The authors stated that the right to be free from sexual violence should be considered a fundamental component of the right to health, and that sexual violence is “one of the most pervasive violations of universal human rights ... [affecting] half of the world's population.”¹¹ The article reviews the history of sexual violence in Haiti to provide context for the post-earthquake setting, and discusses findings from qualitative analyses of the safety and security crisis affecting Haitian women disproportionately. Interviews were conducted with seventy-five rape survivors (ages 5-65), and found a strong correlation between “the absence of even minimal health rights, such as food, clean water, and housing, and an increased vulnerability to sexual violence.”¹¹ Many of the women interviewed expressed having lost family members who previously provided physical security and a source of income, which rendered them more vulnerable to violence.¹¹ The majority of the women had not received a medical exam after they were assaulted either because they could not locate or access health services, or because they feared retaliation and stigma, and some of the clinics that were accessed did not offer HIV prophylaxis or emergency contraception.¹¹ The authors concluded, “while existing international standards clearly articulate the need to address and prevent sexual violence committed against displaced women, high rates of sexual violence against displaced women and

children persist.”¹¹ This statement underscores the discrepancy between international standards (and law), and the disturbing reality of sexual violence on the ground that was captured in all seven of the papers investigating the post-disaster context in Haiti.

2007 Earthquake in Peru

Ojeda Parra (2008) studied the effects of the earthquake that struck Peru in 2007 and is considered the most damaging to have hit the country in a century.⁴³ The author collected testimonies from indirect witnesses and victims of sexual violence in the days following the earthquake. The accounts provided by the health care workers interviewed referenced multiple cases of sexual violence. One excerpt from the testimony of a specialized physician drew attention to the challenges of preventing HIV in cases of sexual violence: “The girl was raped and she became pregnant at age 12...and she was brought in for examination only because she [was] pregnant, if not she would not have received any care at all...but how can you make them understand, both the parents and the girls themselves, that they should go to a health facility after a rape?”⁴³ Ojeda Parra stressed the ways in which forced sex places victims at risk of exposure to HIV, the complex web of factors that prevented those in need from receiving prophylaxis, the dearth of policies and strategies to prevent sexual violence, and the need to understand and disseminate the links between sexual violence and HIV.⁴³

1998 Hurricane Mitch in Honduras and Nicaragua

“Gender and Post-Disaster Reconstruction: The Case of Hurricane Mitch in Honduras and Nicaragua” is a report written by Delaney and Shrader (2000) that investigated the “social variables surrounding disaster vulnerability, described gender differentiated impacts and opportunities during phases of the disaster cycle, and made recommendations to mitigate gendered vulnerabilities to the effects of disasters.”⁴⁵ The authors call attention to one “second generation disaster” that takes place during the emergency and rehabilitation phases of disasters – increased sexual violence.⁴⁵ The report states that a number of shelters witnessed increased sexual violence, coerced prostitution (particularly among adolescent girls), and victimization leading to physical and psychological trauma.⁴⁵ However, beyond asserting that gender analyses during relief planning efforts could “minimize rape, incest, intra-familial violence, STDs,” the report makes no explicit mention of concerns about HIV acquisition from sexual violence.⁴⁵

2007 Hurricane Noel in the Dominican Republic

Alba and Luciano (2008) conducted a mixed methods descriptive study, interviewing both key informants and a sample of individuals from various at-risk populations in the Dominican Republic to assess sexual and reproductive health and violence after the 2007 hurricane.⁴⁴ There did not appear to be significant differences in how sexual violence was experienced in the different geographic regions surveyed.⁴⁴ Between 7.4 and 11.1% of women (ages 15-49 years) had ever experienced sexual violence and about 30% of women had ever experienced emotional, physical or sexual violence by an intimate partner.⁴⁴ The authors identified children as the population most affected by the hurricane, determining that they are particularly vulnerable to sexual violence in shelters.⁴⁴ The authors concluded that the post-hurricane context in the

Dominican Republic was characterized by high risk of sexual violence, including exploitation and abuse and of unwanted pregnancy and HIV.⁴⁴

Contextual Factors of the Post-Disaster Context & Sexual Violence Vulnerability

In addition to identifying existing literature on sexual violence in the post-disaster context in Latin America and the Caribbean and assessing whether ostensible increases in incidence of sexual violence and HIV infection in the post-disaster context are supported by the literature, this review also aimed to describe contextual factors of the post-disaster context that exacerbate sexual violence vulnerabilities. The identification of the most salient contextual factors contributing to vulnerability to sexual violence in the post-disaster context was not expressly defined as the primary objective of any of the studies included in this review. However, several important themes emerged from the collective data, which provide insight into the contextual factors unique to the post-disaster context that may increase sexual violence vulnerability and should be targeted by interventions aiming to reduce sexual violence and its negative health consequences. Factors that were identified in multiple studies as definitive contributors to sexual violence vulnerability are included in *Table 4*. The different types of sexual violence that were documented by the included studies and to which disaster-affected populations may be vulnerable as a result of contextual factors are summarized in *Table 5*.

TABLE 4
Factors Contributing to Vulnerability to Sexual Violence
Gender inequality
Poverty
Collapse of social infrastructure
Lack of security (especially secure housing)
Barriers to healthcare access/lack of healthcare
Lack of economic opportunity
Lawless environment
Disruption of familial and community support systems
Deaths of parents, guardians, protectors
Gendering of poverty
Stigma

TABLE 5
Types of Sexual Violence
Gender-Based Violence (general)
Child Sexual Abuse
Exploitation
Sex Trafficking/Sex Slavery
Survival Sex/Coerced Sex
Forced Sex
Rape
Sexual Assault
Unwanted Touching
Gang Rape
Genital Mutilation/Intentionally Injurious Injury from Rape
Intimate Partner Sexual Violence

All 10 of the studies included in the final review provided evidence of increased sexual violence in the post-disaster context, although there was variability with regard to the types of sexual violence studied. Several important themes emerged from the data. The most frequently studied type of sexual violence was rape, including gang rape. “Forced sex,” “sexual assault” and “assault by multiple perpetrators” were terms employed by authors to describe broader categories of sexual violence, and which included rape and gang rape as well as other forced sexual acts.

Structural factors identified as contributing to sexual violence vulnerability include lack of security, particularly in camps for internally displaced persons. In these settings, tents are often used for shelter and do not provide any protection from forced entry. Additionally, children

are often left alone in tents for brief or extended periods of time as parents or guardians seek work, food and necessary supplies. Several of the studies mentioned that the ways in which camps were constructed created vulnerabilities by necessitating that individuals travel some distance, often alone, to use bathroom facilities, collect water, and carry out other basic needs. On a broader scale, disasters commonly destroy infrastructure, which may include elements of health care systems and may place enormous strain on surviving systems, thereby exacerbating barriers to health care access and needed services. In addition to structural factors, several studies cited social disruption as a major factor leading to increased sexual violence vulnerability. Children and adolescents are often rendered vulnerable to violence as a result of losing parents or guardians during a disaster. Social infrastructure may collapse entirely in the post-disaster context, disrupting support systems and creating a “lawless environment” where vulnerable individuals have no means of protecting themselves from violence, and have few (if any) options for recourse when violence occurs.

Gender inequality was the factor that was most consistently identified as contributing to sexual violence vulnerability. The included studies unanimously identified women and girls as the populations at highest risk for experiencing sexual violence. Gender inequality refers to the unequal power distribution of women relative to men in social hierarchies, and takes many forms including unequal pay, educational opportunity, representation in government and decision-making bodies, gender roles, discrimination, and gender-based violence, among other manifestations. The finding that gender inequality contributes prominently to sexual violence vulnerability suggests that gender gaps in terms of power and agency may widen and gender-based violence may escalate in the post-disaster context.

DISCUSSION

All 10 of the studies included in the final review provided evidence supporting an increase in sexual violence in the post-disaster context, and identified women and girls as the group at highest risk for victimization. This review corroborated results from studies of sexual violence and HIV in conflict settings: at the population level, sexual violence is not significantly associated with increased HIV incidence, but at the individual level, sexual violence is a strong risk factor for HIV acquisition. Rape and gang rape in particular place victims at a higher risk for contracting HIV due to increased risk of genital injury, and in the case of gang rape, perpetration by multiple assailants. A combination of social and structural factors contribute to enhanced vulnerability to sexual violence in the post-disaster context, the most prominent being gender inequality. This review demonstrates that preventing sexual violence in the post-disaster context must be made a priority in emergency preparedness, disaster management and humanitarian relief efforts, and that substantive reductions in sexual violence will only become a reality when pervasive gender inequalities cease to exist.

Health Effects of Sexual Violence

In addition to documenting increased incidence of sexual violence post-disaster, the publications documented increases in several health outcomes related to sexual violence – in particular, trauma-related psychological symptoms and unwanted pregnancy. According to the Center for Disease Control and Prevention’s Division of Violence Prevention, sexual violence has physical, psychological and social consequences, and sexual violence victimization is

associated with risk behaviors, including engaging in high-risk sex, substance abuse, and unhealthy diet-related behaviors.²⁸ Physical consequences include unwanted pregnancy, chronic pain, gastrointestinal and gynecological complications, headaches, cervical cancer, sexually transmitted infections, and genital injuries.²⁸ Psychological consequences may include feelings of anxiety, shame and distrust, and symptoms of post-traumatic stress disorder (PTSD) such as flashbacks and sleep disturbances.²⁸ Survivors of sexual violence may also experience chronic psychological consequences such as depression, anxiety, suicidal ideation, low self-esteem, and PTSD.²⁸ Social consequences of sexual violence associated with stigma and shame may include isolation or ostracism from one's family or community, and lack of social support.²⁸

A primary objective of this review was to investigate one health outcome of sexual violence in particular – HIV. The relative influence of sexual violence on HIV infection at the population level could not be discerned from the publications included in this review. However, several studies were able to shed light on elements of the post-disaster context that increase individual risk of becoming infected with HIV from an experience of sexual violence. Interviews conducted by Davis and Bookey (2011) with Haitian rape survivors revealed that few survivors sought and received medical attention after an assault, and when they did, some clinics did not offer HIV prophylaxis or did not have any such medications in stock.¹¹ These findings were corroborated by Ojeda Parra (2008), who observed a similar situation in Peru.⁴³ These studies captured the powerful influence of stigma that drives both under-reporting of incidents and dissuades survivors from seeking medical care, and the fact that health care systems in the post-disaster context are often over-burdened, highly under-resourced and ill-equipped to meet the needs of survivors.

Two studies documented disturbing accounts of gang rape, which is associated with a high risk of both HIV and unwanted pregnancy.^{26,27} Rahill et al. (2006) ran focus groups with 16 women who had been gang raped in Haiti and found that the women had endured “intentionally injurious assaults by multiple perpetrators.”²⁷ All of the women, save one, had become pregnant as a result of the rapes.²⁷ Joshi et al. (2014) documented a similar trend of purposeful genital injuries that had been inflicted upon women in Haiti.²⁶ Genital injuries that involve broken skin can increase HIV transmission risk, particularly if objects are used to penetrate the body or if cutting or deliberate wound infliction occurs.⁴⁶ The likelihood of HIV infection from rape also increases if there are multiple perpetrators, because it is more likely that genital injury will occur and that one or more of the perpetrators are infected with HIV.²⁶ The studies included in this review provided evidence supporting an association between sexual violence (especially gang rape and violence involving intentional injury) and increased risk of HIV. However, neither this review nor any individual studies provided sufficient evidence to support increased HIV prevalence driven by sexual violence at the population level.

Limitations

The strength of evidence identified for this review was variable but generally of low to medium quality. It should be noted that there is a lack of consensus in the scientific community about best practices for the evaluation of qualitative literature, and few tools exist for the quality assessment of complex systematic literature reviews that unite qualitative, quantitative and mixed methods studies.³⁷ In addition to the variable quality of evidence of the included publications, there are other limitations to the research findings and to the overall review. The majority of included studies had notably small sample sizes, with the exception of the two

quantitative studies. This may have been a function of the qualitative nature of many of the studies, of difficulties incurred in recruiting participants (exacerbated by the humanitarian crisis situation), and the reality that sexual violence is an extremely challenging topic to study. There is very little pre-disaster baseline data available on experiences of sexual violence because incidents are largely unreported.⁴⁷ In fact, sexual violence is the single most under-reported crime in the world.¹ Lack of reporting can be attributed to stigma, fear of retaliation or threats received by assailants, lack of reporting mechanisms, and other factors.¹ Male victims in some regions and communities face dual stigma of homosexuality and HIV associated with sexual violence.³⁹ Testimonials highlighted by Ojeda Parra (2008) revealed that incidents of sexual violence affecting children and adolescents might be even less likely to be reported because of stigma and the requirement of parental consent.⁴³ In post-disaster situations, individuals who have experienced sexual violence may be unable to file a report due to lack of transportation, lack of information about how or where to report, or lack of systems in place to handle cases.¹ As such, there is mostly non-existent or extremely inadequate data collection on incidents of sexual violence both during baseline periods and in the post-disaster context.

CONCLUSIONS

This review identified only 10 articles on sexual violence in the post-disaster context in Latin America and the Caribbean that met the inclusion criteria. Additional, high quality research is urgently needed in this area to better understand the dynamics of sexual violence in the post-disaster context and to inform future interventions, especially given that the region remains at high risk for natural disasters and the frequency of disasters will likely increase with continued climate change. Interventions aiming to reduce sexual violence in the post-disaster context should target specific structural factors by boosting camp security, strengthening health systems, and creating economic opportunities to alleviate poverty, and social factors by working to reduce stigma and providing services and protection for the most vulnerable groups, including children and adolescents. The harsh reality of the matter, however, is that sexual violence will persist until its root causes, including the systems that endorse and perpetuate gender inequality, are dismantled and replaced by systems that empower women, girls and all those who are systematically disadvantaged.

Future Research Directions

The nearly exclusive focus of these studies on women and girls and the selection of study participants from these populations represent limitations affecting the body of existing literature on sexual violence, given that there may be other groups that are highly vulnerable to experiencing sexual violence that have not yet been identified or well studied. Orphans, boys, disabled persons and lesbian, gay, bisexual and transgendered (LGBT) individuals represent other groups considered to be at potentially high risk for sexual victimization, but are absent from the literature. Several publications that were ultimately excluded during the full text review phase investigated these groups, including Nicholas et al. (2012), who estimate that upwards of 380,000 children were displaced by the 2010 Haitian earthquake, and cite displacement, poverty, sexual exploitation, and sexual abuse of child laborers as risk factors for childhood HIV acquisition.⁴⁸ Furthermore, children who are not orphans but acquire HIV may be abandoned by families due to stigma or inability to care for the child.⁴⁸ In a commentary paper, Malow et al.

(2010) raise similar concerns about increased HIV risks for orphaned children involved in survival behaviors and at risk for trafficking, particularly after deaths of parents and guardians in the earthquake.⁴⁹ Zea et al. (2013) investigated “experiences of internal displacement among Colombian gay and bisexual men and male-to-female transgender individuals,” and illuminated the ways in which gay, bisexual and transgendered individuals can be particularly vulnerable to sexual violence and HIV.⁵⁰ There is an urgent need to expand upon the work of Nicholas et al. (2012), Malow et al. (2012), and Zea et al. (2013) to better understand if there are populations in addition to girls and women that are highly vulnerable to sexual violence and HIV in the post-disaster context. While expanding the scope of sexual violence research, parallel efforts must also be made to scale up and improve the quality of research being conducted with the populations already known to be disproportionately affected by sexual violence – women and girls.

Recommendations

There is an urgent need to strengthen global capacity to prevent sexual violence in humanitarian crises caused by natural disasters. Understanding the dynamics of sexual violence, factors that increase vulnerability and drivers of sexual violence perpetration must be made an international research priority. The existing literature on sexual violence in post-disaster contexts is woefully lacking, as are surveillance systems for tracking and monitoring incidents of sexual violence and services to support and provide medical care for survivors. High quality research initiatives are urgently needed to inform coordinated efforts to provide protection against sexual violence for vulnerable populations and to provide necessary short- and long-term care for survivors in the post-disaster context.

Lastly, it is absolutely essential to recognize that incidents of sexual violence in the post-disaster context do not occur in isolation, nor are they anomalies – they epitomize the structures of power that societies uphold in the non-disaster context. Sexual violence is pervasive in every corner of the world and conditions of the post-disaster context simply exacerbate an existing problem. The prevention and elimination of sexual violence in non-disaster contexts must also be a global priority.

APPENDIX 1 *Search Strategy*

PubMed Search Strategy: (((("hiv"[MeSH Terms] OR "hiv"[All Fields]) OR "HIV-AIDS"[All Fields] OR "human immunodeficiency virus"[All Fields] OR "HIV prevalence"[All Fields] OR "HIV incidence"[All Fields] OR "HIV transmission"[All Fields] OR "HIV acquisition"[All Fields] OR "HIV epidemiology"[All Fields] OR "HIV prevention"[All Fields]) AND (("rape"[MeSH Terms] OR "rape"[All Fields]) OR ("sex offenses"[MeSH Terms] OR ("sex"[All Fields] AND "offenses"[All Fields]) OR "sex offenses"[All Fields] OR ("sex"[All Fields] AND "offense"[All Fields]) OR "sex offense"[All Fields]) OR ("child abuse, sexual"[MeSH Terms] OR ("child"[All Fields] AND "abuse"[All Fields] AND "sexual"[All Fields]) OR "sexual child abuse"[All Fields] OR ("sexual"[All Fields] AND "child"[All Fields] AND "abuse"[All Fields])) OR ("human trafficking"[MeSH Terms] OR ("human"[All Fields] AND "trafficking"[All Fields]) OR "human trafficking"[All Fields]) OR ("intimate partner violence"[MeSH Terms] OR ("intimate"[All Fields] AND "partner"[All Fields] AND "violence"[All Fields]) OR "intimate partner violence"[All Fields]) OR "rape"[All Fields] OR "raped"[All Fields] OR "forced sex"[All Fields] OR "sexual assault"[All Fields] OR "sexually assaulted"[All Fields] OR "sex trafficking"[All Fields] OR "sexual violence"[All Fields])) AND (("geological processes"[MeSH Terms] OR ("geological"[All Fields] AND "processes"[All Fields]) OR "geological processes"[All Fields] OR ("geological"[All Fields] AND "process"[All Fields]) OR "geological process"[All Fields]) OR ("disasters"[MeSH Terms] OR "disasters"[All Fields] OR "disaster"[All Fields]) OR "natural disaster"[All Fields] OR "earthquake"[All Fields] OR "flood"[All Fields] OR "flooding"[All Fields] OR "drought"[All Fields] OR "avalanche"[All Fields] OR "tidal wave"[All Fields] OR "volcanic eruption"[All Fields] OR "hurricane"[All Fields] OR "tsunami"[All Fields] OR "storm"[All Fields] OR "tropical storm"[All Fields] OR "disaster emergency"[All Fields])) AND (("emergency shelter"[MeSH Terms] OR ("emergency"[All Fields] AND "shelter"[All Fields]) OR "emergency shelter"[All Fields]) OR (("emergencies"[MeSH Terms] OR "emergencies"[All Fields] OR "emergency"[All Fields]) AND camp[All Fields]) OR "humanitarian crisis"[All Fields] OR "humanitarian setting"[All Fields] OR "camp"[All Fields] OR (internal[All Fields] AND ("displacement (psychology)"[MeSH Terms] OR ("displacement"[All Fields] AND "(psychology)"[All Fields]) OR "displacement (psychology)"[All Fields] OR "displacement"[All Fields]) AND camp[All Fields]) OR "refugee camp"[All Fields] OR "evacuation"[All Fields] OR "evacuee"[All Fields] OR "displacement"[All Fields] OR "internally displaced"[All Fields])

Ovid Global Health Search Strategy:

# ▼	Searches	Results	Type
22	from 21 keep 1-16	16	Advanced
21	15 and 19 and 20	16	Advanced
20	13 or 16 or 17 or 18	3571	Advanced
19	5 or 6 or 7 or 8 or 9 or 10	11980	Advanced
18	forced sex.mp.	136	Advanced
17	sex trafficking.mp.	39	Advanced
16	sexual assault/ or "rape (trauma)"/ or sexual abuse/	2636	Advanced
15	3 or 14	157230	Advanced
14	HIV infection.mp. or HIV infections/	108833	Advanced
13	sex offenses.mp. or sexual abuse.sh. or child abuse.sh.	3172	Advanced
12	internally displaced.mp. or displacement.sh.	353	Advanced
11	refugee camp.mp.	280	Advanced
10	emergencies/ or natural disasters/ or refugees/ or emergency relief/	8369	Advanced
9	avalanches/ or landslides/	132	Advanced
8	floods/ or natural disasters/	3440	Advanced
7	earthquakes/	1380	Advanced
6	natural disasters/ or emergencies/ or floods/ or volcanoes/	6231	Advanced
5	disasters/ or natural disasters/ or drought/	5880	Advanced
4	sexually transmitted diseases/ or reproductive health/ or sexual health/	32026	Advanced
3	1 or 2	157230	Advanced
2	HIV.mp. or exp human immunodeficiency viruses/	157230	Advanced
1	HIV.mp. or exp human immunodeficiency viruses/	157230	Advanced

Web of Science Search Strategy:

Keyword combinations of “HIV” AND “sexual violence” OR “rape” OR “sexual assault” AND “natural disaster”, and synonyms were searched. Additional key word combinations were searched after reviewing the “key word lists” of relevant papers from the initial search, The Web of Science citation analysis functions were utilized to find similar, relevant articles and articles that had been cited by search results or that were contained in the reference lists of the search results.

LILACS Search Strategy:

Subject descriptors: “HIV infections”; “Disasters”; “Reproductive Health”
(tw:(hiv)) AND (tw:(rape OR sexual assault OR sexual violence)) AND (tw:(disaster)) AND (instance:"regional") and (tw:(hiv)) AND (tw:(disasters)) AND (instance:"regional") AND (pais_assunto:("caribe" OR "haiti" OR "america do sul" OR "brasil" OR "caribe ingles" OR "jamaica") AND la:("en"))

APPENDIX 2 Mixed Methods Appraisal Tool Criteria and Template³⁷

PART I. MMAT criteria & one-page template (to be included in appraisal forms)

Types of mixed methods study components or primary studies	Methodological quality criteria (see tutorial for definitions and examples)	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	<ul style="list-style-type: none"> Are there clear qualitative and quantitative research questions (or objectives*), or a clear mixed methods question (or objective*)? Do the collected data allow address the research question (objective)? E.g., consider whether the follow-up period is long enough for the outcome to occur (for longitudinal studies or study components). <p><i>Further appraisal may be not feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.</i></p>				
1. Qualitative	1.1. Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question (objective)? 1.2. Is the process for analyzing qualitative data relevant to address the research question (objective)? 1.3. Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected? 1.4. Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?				
2. Quantitative randomized controlled (trials)	2.1. Is there a clear description of the randomization (or an appropriate sequence generation)? 2.2. Is there a clear description of the allocation concealment (or blinding when applicable)? 2.3. Are there complete outcome data (80% or above)? 2.4. Is there low withdrawal/drop-out (below 20%)?				
3. Quantitative non-randomized	3.1. Are participants (organizations) recruited in a way that minimizes selection bias? 3.2. Are measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes? 3.3. In the groups being compared (exposed vs. non-exposed; with intervention vs. without; cases vs. controls), are the participants comparable, or do researchers take into account (control for) the difference between these groups? 3.4. Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)? 4.2. Is the sample representative of the population understudy? 4.3. Are measurements appropriate (clear origin, or validity known, or standard instrument)? 4.4. Is there an acceptable response rate (60% or above)?				
5. Mixed methods	5.1. Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)? 5.2. Is the integration of qualitative and quantitative data (or results*) relevant to address the research question (objective)? 5.3. Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results*) in a triangulation design? <p><i>Criteria for the qualitative component (1.1 to 1.4), and appropriate criteria for the quantitative component (2.1 to 2.4, or 3.1 to 3.4, or 4.1 to 4.4), must be also applied.</i></p>				

*These two items are not considered as double-barreled items since in mixed methods research, (1) there may be research questions (quantitative research) or research objectives (qualitative research), and (2) data may be integrated, and/or qualitative findings and quantitative results can be integrated.

References

1. Gender-Based Violence and Natural Disasters in Latin America and the Caribbean. *United Nations Population Fund*.
2. Global Campaign for Violence and Injury Prevention - Chapter 6 - Sexual Violence. *World Health Organization*. 149.
3. The human cost of natural disasters 2015: a global perspective. *Center for Research on the Epidemiology of Disasters, UN International Strategy for Disaster Reduction*. 2015.
4. Atkinson HG, Bruce J. Adolescent Girls, Human Rights and the Expanding Climate Emergency. *Annals of global health*. 2015;81(3):323-330.
5. Leaning J, Guha-Sapir D. Natural Disasters, Armed Conflict, and Public Health. *New England Journal of Medicine*. 2013;369(19):1836-1842.
6. Weiss Fagen P. Natural Disasters in Latin America and the Caribbean: national, regional, and international interactions: A regional case study on the role of the affected state in humanitarian action. *Humanitarian Policy Group Working Paper*. 2008.
7. Ecuador declares national mourning as quake death toll rises to 646. *British Broadcasting Corporation World News - Latin America and the Caribbean*. 2016.
8. Al Gasseer N, Dresden E, Keeney GB, Warren N. Status of women and infants in complex humanitarian emergencies. *Journal of midwifery & women's health*. 2004;49(4 Suppl 1):7-13.
9. Asgary R, Emery E, Wong M. Systematic review of prevention and management strategies for the consequences of gender-based violence in refugee settings. *International Health*. 2013;5(2):85-91.
10. Fisher S. Violence against women and natural disasters: findings from post-tsunami Sri Lanka. *Violence against women*. 2010;16(8):902-918.
11. Davis L, Bookey B. Fanm ayisyen pap kase: respecting the right to health of Haitian women and girls. *Health and human rights*. 2011;13(1):E50-61.
12. Onyango MA, Hixson BL, McNally S. Minimum Initial Service Package (MISP) for reproductive health during emergencies: Time for a new paradigm? *Global public health*. 2013;8(3):342-356.
13. Inter-Agency Reproductive Health Kits for Crisis Situations -- Manual. *United Nations Population Fund*. 2011.
14. Understanding and Addressing Violence Against Women - Sexual Violence. *World Health Organization*. 2012.
15. Austin J, Guy S, Lee-Jones L, McGinn T, Schlecht J. Reproductive health: A right for refugees and internally displaced persons. *Reproductive Health Matters*. 2008;16(31):10-21.
16. Bruns L, Spiegel P. Displaced persons and HIV care: Challenges and solutions. *Southern African Journal of Hiv Medicine*. 2007(26):42-43.
17. Connolly MA, Gayer M, Ryan MJ, Salama P, Spiegel P, Heymann DL. Communicable diseases in complex emergencies: impact and challenges. *Lancet*. 2004;364(9449):1974-1983.
18. Lowicki-Zucca M, Spiegel PB, Kelly S, Dehne KL, Walker N, Ghys PD. Estimates of HIV burden in emergencies. *Sexually transmitted infections*. 2008;84:I42-I48.
19. Khaw AJ, Salama P, Burkholder B, Dondero TJ. HIV risk and prevention in emergency-affected populations: a review. *Disasters*. 2000;24(3):181-197.

20. Strathdee SA, Stachowiak JA, Todd CS, et al. Complex emergencies, HIV, and substance use: No "big easy" solution. *Substance Use & Misuse*. 2006;41(10-12):1637-1651.
21. Anema A, Joffres MR, Mills E, Spiegel PB. Widespread rape does not directly appear to increase the overall HIV prevalence in conflict-affected countries: so now what? *Emerging themes in epidemiology*. 2008;5:11.
22. Spiegel PB. HIV/AIDS among conflict-affected and displaced populations: Dispelling myths and taking action. *Disasters*. 2004;28(3):322-339.
23. Watts CH, Foss AM, Hossain M, Zimmerman C, von Simson R, Klot J. Sexual violence and conflict in Africa: prevalence and potential impact on HIV incidence. *Sexually transmitted infections*. 2010;86:III93-III99.
24. Bennett BW, Marshall BDL, Gjelsvik A, McGarvey ST, Lurie MN. HIV Incidence Prior to, during, and after Violent Conflict in 36 Sub-Saharan African Nations, 1990-2012: An Ecological Study. *PloS one*. 2015;10(11).
25. Harling G, Msisha W, Subramanian SV. No association between HIV and intimate partner violence among women in 10 developing countries. *PloS one*. 2010;5(12):e14257.
26. Joshi M, Rahill, G.J., Lescano, C., Jean, F. Language of Sexual Violence in Haiti: Perceptions of Victims, Community-level Workers, and Health Care Providers. *Journal of Health Care for the Poor and Underserved*. 2014;25(4):1623-1640.
27. Rahill GJ, Joshi M, Hernandez A. Adapting an evidence-based intervention for HIV to avail access to testing and risk-reduction counseling for female victims of sexual violence in post-earthquake Haiti. *AIDS care*. 2016;28(2):250-256.
28. Sexual Violence: Consequences. *Centers for Disease Control and Prevention - National Center for Injury Prevention and Control - Division of Violence Prevention*. 2015.
29. Rezaeian M. The association between natural disasters and violence: A systematic review of the literature and a call for more epidemiological studies. *Journal of research in medical sciences : the official journal of Isfahan University of Medical Sciences*. 2013;18(12):1103-1107.
30. Kim AA, Malele F, Kaiser R, et al. HIV Infection Among Internally Displaced Women and Women Residing in River Populations Along the Congo River, Democratic Republic of Congo. *Aids and Behavior*. 2009;13(5):914-920.
31. Patel SH, Muyinda H, Sewankambo NK, Oyat G, Atim S, Spittal PM. In the face of war: examining sexual vulnerabilities of Acholi adolescent girls living in displacement camps in conflict-affected Northern Uganda. *Bmc International Health and Human Rights*. 2012;12.
32. Spangaro J, Adogu C, Ranmuthugala G, Powell Davies G, Steinacker L, Zwi A. What evidence exists for initiatives to reduce risk and incidence of sexual violence in armed conflict and other humanitarian crises? A systematic review. *PloS one*. 2013;8(5):e62600.
33. Spiegel PB, Bennedsen AR, Claass J, et al. Prevalence of HIV infection in conflict-affected and displaced people in seven sub-Saharan African countries: a systematic review. *Lancet*. 2007;369(9580):2187-2195.
34. Stark L, Ager A. A Systematic Review of Prevalence Studies of Gender-Based Violence in Complex Emergencies. *Trauma Violence & Abuse*. 2011;12(3):127-134.
35. PRISMA Checklist. *PRISMA: Transparent Reporting of Systematic Reviews and Meta-Analyses*. 2015.
36. Latin America and Caribbean. *The World Bank*.

37. Pluye P, et al. Proposal: A mixed methods appraisal tool for systematic mixed studies reviews: Mixed Methods Appraisal Tool (MMAT). 2011.
38. Kolbe AR, Hutson RA, Shannon H, et al. Mortality, crime and access to basic needs before and after the Haiti earthquake: a random survey of Port-au-Prince households. *Medicine, conflict, and survival*. 2010;26(4):281-297.
39. D'Adesky Aea. Beyond Shock: Charting the Landscape of Sexual Violence in Post-Quake Haiti -- Progress, Challenges & Emerging Trends 2010-2012. 2012.
40. Raphael K. Recall Bias: A Proposal for Assessment and Control. *International Journal of Epidemiology*. 1987;16(2):167-170.
41. Logie CH, Daniel C. 'My body is mine': Qualitatively exploring agency among internally displaced women participants in a small-group intervention in Leogane, Haiti. *Global public health*. 2016;11(1-2):122-134.
42. Satterthwaite M, et al. Sexual Violence in Haiti's IDP Camps: Results of a Household Survey. *Center for Human Rights and Global Justice - NYU School of Law*. 2011.
43. Ojeda Parra T. Natural Disasters and Violence against Women: The Case of the 2007 Earthquake in Peru. *The Multiple Faces of the Intersections between HIV and Violence Against Women. Development Connections, UNIFEM, PAHO, Inter-American Commission of Women and the Latin American and Caribbean Women's Health Network*. 2008:61-69.
44. Alba W, and Luciano, D. Salud sexual y reproductiva y violencia en personas vulnerables: La tormenta Noel en República Dominicana. *INSTRAW and UNFPA*. 2008.
45. Delaney PL, Shrader, E. Gender and Post-Disaster Reconstruction: The Case of Hurricane Mitch in Honduras and Nicaragua. *The World Bank*. 2000.
46. Draughton JE. Sexual Assault Injuries and Increased Risk of HIV Transmission. *Adv Emerg Nurs J*. 2012;34(1):82-87.
47. Guidelines for Gender-based Violence Interventions in Humanitarian Settings - Focusing on Prevention of and Response to Sexual Violence in Emergencies. *United States High Commissioner for Refugees*. 2005.
48. Nicholas PK, George EK, Raymond N, et al. Orphans and at-risk children in Haiti: vulnerabilities and human rights issues postearthquake. *ANS. Advances in nursing science*. 2012;35(2):182-189.
49. Malow R, Rosenberg R, Lichtenstein B, Devieux JG. The impact of disaster on HIV in Haiti and priority areas related to the Haitian crisis. *The Journal of the Association of Nurses in AIDS Care : JANAC*. 2010;21(3):283-288.
50. Zea MC, Reisen CA, Bianchi FT, et al. Armed conflict, homonegativity and forced internal displacement: implications for HIV among Colombian gay, bisexual and transgender individuals. *Culture Health & Sexuality*. 2013;15(7):788-803.