



Violence and abuse of internally displaced women survivors of the 2010 Haiti earthquake

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Abstract

Objectives Limited research following disasters suggests that internally displaced women are disproportionately vulnerable to violence and abuse. An interdisciplinary collaborative of researchers and practitioners in Haiti, the US Virgin Islands, and the US Mainland investigated gender-based violence (GBV) pre- and post-earthquake and health outcomes among Haitian women living in tent cities/camps following the 2010 earthquake.

Methods A comparative descriptive correlational design using culturally sensitive and language appropriate

computer-assisted interviews of 208 internally displaced women 2011–2013.

Results Found high rates of violence and abuse both before (71.2 %) and after (75 %) $p = 0.266$, the earthquake primarily perpetrated by boy friends or husbands. Significantly more mental and physical health problems were reported by abused than non-abused women. The majority (60–78 %) of abused women did not report personal or community tolerance for violence and abuse, but acknowledged a community context of limited involvement.

Conclusions Coordinated planning and implementation of needed interventions are essential to provide a balanced approach to the care of displaced women after natural disasters with sensitivity to the abusive experiences of many women both before and after the disasters.

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Keywords Gender-based violence · Intimate partner violence and abuse · Women's health · Natural disasters and violence · Internally displaced disaster survivors · Culturally sensitive research

Introduction

Gender-based violence (GBV) is broadly defined as any violent act perpetrated on the basis of socially assigned gender differences (UN 1993). GBV includes physical, psychological, economic, sexual violence, exploitive, or coercive acts. GBV may also comprise harmful traditional intimate partner violence (IPV) or violence at the hands of ex-partners and non-partners. Non-partners may range from parents and other family members to acquaintances, strangers, and employers. The most rigorous research on GBV after natural disasters was done in the United States following large hurricanes, such as Hurricane Katrina and

Hurricane Hugo (Anastario et al. 2009; Harville et al. 2011). The results of these studies are consistent with the non-refereed descriptive reports. These reports included high rates of domestic violence in periods following the 2004 Sri Lanka tsunami (Fisher 2010) and in Honduras and Nicaragua after Hurricane Mitch (Cupples 2007). The Anastario study suggested that the rates may continue to be high for up to 2 years after the event (Anastario et al. 2009). However, these results are seriously limited, because of the lack of formal measurement of comparable GBV before and after the natural disasters. Some of the findings suggest that GBV is high in the immediate period following a natural disaster in a context where there were high rates prior to the disaster (Harville et al. 2011).

Haiti earthquake

The 2010 earthquake not only caused social and economic upheaval, but also massive environmental damage. The major school of nursing, the capitol building, and every major governmental building were leveled. Collapse of social infrastructure; the erosion of family and community networks; inequitable access to services; lack of secure housing; absence of law enforcement; and dependence resulting from economic dislocation potentially contributed to the risk for GBV (Bookey 2011; Hammond 2012). Three key local leaders and women's advocates—Myriam Merlet, Magalie Marcelin, and Anne Marie Coriolan—all tragically died in the earthquake. They were the founders of the country's most important advocacy organizations working on the behalf of women. Their loss left women in the community few remaining resources (Abifareh 2010).

Gender roles, violence, and sexual assault context

Within the traditional Haitian families, gender roles are reported as being strictly distinct between males and females. Women are in charge of income-generating marketing, domestic household tasks, and child care; men are responsible for maintenance of the home, farming, and providing for the family (Miller 2000). Haitian women reported that men usually make the couple's decisions regarding birth control according to two reports (Fordyce 2009; Maternowski 2006).

Although GBV prevalence data in the Caribbean are limited, a recent self-report study of 1059 women in health care settings in the US Virgin Islands showed a 33 % prevalence of lifetime IPV. The current IPV was 27 % (Stockman et al. 2014). In other Caribbean countries, high rates of physical IPV (45.3–50 %) and sexual IPV (52.8–72.6 %) have been reported (LeFranc et al. 2008). A recent analysis of data on IPV from population-based surveys conducted in 12 Latin American and Caribbean

countries reported substantial lifetime (13.4–17.2 %) and past year (6.5–12 %) prevalence of physical violence (Bott et al. 2012). In Haiti, specifically, 2005 data revealed 19.3 % of women reported ever experiencing physical or sexual assaults from a partner and 17.5 % reporting IPV in the past year (Bott et al. 2012). In another pre-earthquake survey, 28.8 % of ever-married women reported having been beaten by a spouse (Martens and Ansley 2007). A 2006 study in Port Au Prince (PAP), Haiti, reported that between 2004 and 2006, 35,000 women were raped. More than half of these were female victims under the age of 18 (Kolbe and Hutson 2006). In the only previous post-earthquake study, Davis and Bookey conducted a qualitative analysis in the summer of 2010. The study consisted of more than 75 women and girls who had experienced rape since January 2010. The participants reported that the earthquake had destroyed their support networks and livelihood. This left them more vulnerable to violence (Davis and Bookey 2011). However, this was a very small sample and did not use a validated measure of GBV.

The research reported herein followed Phase I of a multi-phased project. Phase I included an initial situational analysis to assess how best to explore the experiences of GBV of women following the 2010 earthquake. The study was done in collaboration with an interdisciplinary research team in Haiti (Sloand et al. 2015). Focus groups were held with representatives from various health and social services agencies and internally displaced women in PAP and surrounding communities. Input from these groups informed strategies used to frame the research questions. An advisory group of collaborating researchers and consultants with expertise in GBV and experience with internally displaced groups following disasters was formed (Sloand et al. 2015).

The purpose of the study reported here, Phase II, was to describe the extent of intimate partner violence and abuse, both before and after the Haiti Earthquake of 2010, data not previously reported. In addition, the study examined abuse-related health consequences, risk factors, and cultural attitudes about violence and abuse of women among those internally displaced living in PAP and surrounding tent cities and camps. The research team included experts and consultants on GBV from the US Virgin Islands, several US mainland universities, and local Haitian health and social services providers.

Methods

Study design

A comparative descriptive correlational study was conducted during 2011–2013. The protocol for the protection of human subjects was reviewed and approved by the

Office of Sponsored Research of the sponsoring university, the National Ethics Committee of Haiti, and the National Institute on Minority Health and Health Disparities. The study was done in conformity with the World Health Organization (WHO) guidelines for research (WHO 2008).

Recruitment of participants

Trained research assistants invited women attending local hospitals or clinics to participate in the study. Response rates were not systematically transmitted to the research team related to limited research infrastructure. The research assistants were trained by the research team and were female physicians familiar with the healthcare facilities, where participants were recruited. Inclusion criteria were: Haitian National; spoke Haitian Creole, French or English; between the ages of 18–44 years; and living in a tent city or camp as an internally displaced woman in PAP or a nearby community. Eligible women were designated as a case (abused) based on any yes responses on the Abuse Assessment Screen (AAS) (McFarlane et al. 1992); and/or score >19 on the Women's Experience with Battering (WEB) scale as recommended by the author (Smith et al. 1995) both validated screens for IPV (Rabin et al. 2009), or control (not abused).

Data collection

Women were approached in a waiting area and invited to participate in a “women's health study.” Interested women were escorted to a private room where they were consented, screened, and if eligible, completed the interview. Participants used a touch screen audio computer-assisted self-interview device (ACASI) in Haitian Creole or French. The ACASI technology had been used successfully by this research team with African Caribbean and African American women in an earlier study of abused women. Its advantages were high rates of disclosure of sensitive and private information (Stockman et al. 2014). The survey took approximately 1–1.5 h. Responses indicating that the woman was in imminent danger or needed an immediate medical or social services referral triggered a computer alert to the research assistant at the end of the survey. The research assistants were trained to make appropriate referrals, provide information on available resources, and submit written reports of each event. Participants received small monetary gifts worth US\$5 in Haitian currency (gourds) for their participation.

Measures

The research team made minor adaptations of the survey instruments to fit the Haitian context based on the focus

group results. The surveys were translated by certified translators into Haitian Creole and French. The surveys were then back translated and checked for the cultural appropriateness and linguistic accuracy with the guidance of Haitian collaborators. IPV was defined as a pattern of physical and/or sexual assaults within a context of coercive control from a current or former intimate partner (Humphreys and Campbell 2010). Psychometric properties of the instruments used in the study are summarized below. The AAS was used to identify abused women (McFarlane et al. 1992) and screen for eligibility. The instrument has been used extensively in international and multi-ethnic settings with substantial psychometric support (Rabin et al. 2009). Five items assess frequency and perpetrator of physical, sexual, and emotional abuses. Reliability for the previous samples of pregnant women was Alpha = 0.83; for the current sample reliability, Alpha = 0.89.

1. The WEB Scale is a 10-item self-report scale used to measure psychological abuse or emotional partner abuse (Smith et al. 1995). It has been used with African-American and white women in family practice settings (Alpha = 0.95); Alpha = 0.89 for the current sample.
2. The Severity of Violence Against Women Scale (SVAWS) measured frequency and severity of specific threats and acts of partner physical and sexual violence (Marshall 1992) using a 4-point frequency scale (1 = never, 2 = once, 3 = a few times, and 4 = many times). Points are summed to create the subscale score. The initial internal consistency reliability estimates ranged from 0.89 to 0.96 for a sample of community women. Alpha = 0.95 for the current sample.
3. The Danger Assessment (DA) (Campbell et al. 2009) is a 20-item scale that assesses the danger of intimate partner homicide for abused women. All research samples have included a substantial portion of minority women (primarily African American) and women from a variety of clinical and community settings. Internal consistency has ranged between 0.60 to 0.86 and test-retest reliability of 0.89 to 0.94. Alpha = 0.83 for the current sample.
4. Suicidal behavior was evaluated with one item from the DA (“Have you ever threatened or tried to commit suicide?”) (Campbell et al. 2009). Women were also asked, “Have you ever ingested a folk medicine or concoction in an attempt to commit suicide?” a question proposed by the Haitian healthcare providers to assess for suicidality in the Haitian context.
5. The Physical Health and Quality-of-Life Scale (SF8) measured overall health and activity limitations using questions from a short version of the SF36 (Roberts

et al. 2008). The women were asked to rate their health before and after the earthquake without considering abuse status. $\alpha = 0.82$ for the current sample.

6. The Miller Abuse Physical Symptom and Injury Scale (MAPSAIS) measured frequency of injuries and symptoms in symptom clusters in abused women (Anderson et al. 2015). This scale was designed specifically for measuring long-term health consequences of battering. Test–retest reliability during a 2-year period on the history of violent injury was 0.63; $\alpha = 0.67$ for this study.
7. Primary Care-Post-Traumatic Stress Disorder (PC-PTSD) screen (Freedy et al. 2010) is a brief PTSD screening test developed to be used in a primary care setting. The test items represent the four symptom types unique to the PTSD diagnosis based on the previous factor analytic studies (re-experiencing, numbing, avoidance and hyperarousal). Using a cut-off score of 3, the following test characteristics were determined: 85 % diagnostic efficiency; 78 % sensitivity; and 87 % specificity. Internal consistency: $\alpha = 0.86$ for the current sample.
8. The Center for Epidemiological Studies (CES) D-10 scale was used to measure depression. The 10-item self-report measure has an internal consistency of 0.86 (Radloff 1977); $\alpha = 0.84$ for the current sample.
9. Four items from the WHO multi-country study were used to evaluate individual and community attitudes, beliefs, and tolerance of community or GBV (Garcia-Moreno et al. 2006). The measure has also been used with African–American women in the US and women of African descent in the US Virgin Islands with the evidence of construct validity (Stockman et al. 2014).

Data analysis

Demographic characteristics are summarized in Table 1. Analysis of frequency (Chi-square test) was used to compare the abuse prevalence, self-reported health status, and physical activities both pre-earthquake and post-earthquake. The two-sample *t* test was used to compare differences in mean score for the symptom clusters between abused and non-abused Haitian adult women post-earthquake. Logistic regression was used to determine the odds ratios of symptom clusters post-earthquake while controlling for the demographic characteristics. Multiple regression was used to explore the potential impact of demographic characteristics and severity of IPV on PTSD. All statistical analyses were carried out using the SAS Version 9.4. The sample included 208 women screened and living as displaced persons in or near Port au Prince, Haiti.

Table 1 Sample demographics of Haitian adult women ($n = 208$) (Haiti 2011–2013)

Variables	Frequency	Percent
Age		
18–25	88	42.3
26–35	92	44.2
36 or older	28	13.5
Education		
No response	1	0.5
Never attended school	23	11.1
8th Grade or less	79	38.0
Less than high school	89	42.8
Completed high school	8	3.8
Some college or trade school	3	1.4
Completed college or trade school	5	2.4
Born in Haiti		
No	6	2.9
Yes	202	97.1
Marital status		
Single	84	40.4
Partnered, but not married	78	37.5
Married	22	10.6
Divorced	4	1.9
Widowed	9	4.3
Other	11	5.3
Employed		
No response	2	1.0
No	188	90.4
Yes	18	8.6
Ethnicity		
Haitian Creole	206	99.0
Mixed	2	1.0
Health insurance		
No	201	96.6
Yes	7	3.4
Pregnant		
No	196	94.2
Yes	7	3.4
Do not know	5	2.4

Results

Following the earthquake, almost all subjects (99 %) identified as Haitian Creole and were born in Haiti (97.1 %). The average age of the women was 28.04 years (SD 7.00, range 18–44) (Table 1). More than 90 % had less than a high school education (with 38.0 % achieving 8th grade or less; 11.1 % never attended school). Almost 11 % of women in the sample reported being married and 8.6 % were employed. The vast majority (96.6 %) had no health

Table 2 Abuse prevalence pre- and post-earthquake (Haiti 2011–2013)

Types of abuse	Earthquake		<i>p</i> value
	Pre <i>n</i> (%)	Post <i>n</i> (%)	
Physically, emotionally, or sexually abused			
No	60 (28.8)	50 (24.0)	0.266
Yes	148 (71.2)	158 (75.0)	
Physically and/or sexually abused			
No	81 (38.9)	75 (36.1)	0.543
Yes	127 (61.1)	133 (63.9)	
Emotionally or physically abused			
No	63 (30.3)	58 (27.9)	0.589
Yes	145 (69.7)	150 (72.1)	
Physically abused			
No	84 (40.4)	79 (38.0)	0.616
Yes	124 (59.6)	129 (62.0)	
Sexually abused			
No	106 (51.0)	103 (49.5)	0.769
Yes	102 (49.0)	105 (50.5)	

insurance. The monthly income of most of the women (57.7 %) was less than the equivalent of US\$30 despite the level of education. Seven (~3 %) women were currently pregnant. Fifty percent indicated that they had children living with them. About 92.0 % of women reported that the earthquake destroyed their homes.

As shown in Table 2, almost three quarters of the women reported being abused physically, psychologically, or sexually in the 2-years pre-earthquake ($n = 148$; 71.2 %); and in the 2-years post-earthquake ($n = 158$; 75.0 %). One hundred and twenty-four (59.6 %) reported physical abuse pre-earthquake; while 129 (62.0 %) reported physical abuse post-earthquake; with 49.0 % ($n = 102$) and 50.5 % ($n = 105$) reporting sexual abuse pre- and post-earthquake, respectively. Relatively few ($n = 7$; 6.9 %) women were abused by someone other than a partner pre-earthquake and only 11 (6.6 %) women were sexually abused by a non-partner post-earthquake. The prevalence of abuse in all categories was not significantly different pre- and post-earthquake.

The majority of the women (63.5 %) reported having a partner. The reported partner was either a boy friend (38.0 %) or husband (32.7 %) (Table 3). The vast majority (80.4 %) of the abused women were abused by partners or ex-partners both pre-earthquake and post-earthquake. The women reported husbands or ex-husbands (38.5 %) and boy friends or ex-boyfriends (34.7 %) as the most frequent abuser. About 51.4 % lived with the abusive partner and the majority (58.2 %) had left the abusive relationship at

some point in their relationship. About 55 % of the abusive partners were never or very seldom employed.

As shown in Table 4, the majority of women, abused and not, reported their health status as fair, poor, or very poor pre-earthquake (57.2 %), with a significantly higher proportion post-earthquake (76.9 %). Nearly one-fourth (24.5 %) ranked their health status as excellent pre-earthquake, while only 10.1 % did so post-earthquake ($p < 0.0001$). Although there was an overall decline in physical activities post-earthquake, this decline was not significant. A slightly larger proportion of the physically, psychologically, and sexually abused women's self-reported health status was fair, poor, or very poor pre-earthquake (62.1 %). Post-earthquake, this group reported the highest percentage at those ratings (82.4 %). A lower proportion of abused women (18.3 %) ranked their health status as excellent pre-earthquake, while only 6.3 % did so post-earthquake. This was significantly higher than the non-abused group. Similar to the overall sample, there was a significant decline in self-reported health status of abused women post-earthquake ($p < 0.0001$). Contrary to the overall sample, a significant number of abused women reported a decline in their physical activities post-earthquake ($p = 0.043$).

As indicated in Table 5, there were significant differences post-earthquake between abused and non-abused groups in mean symptom scores on the Danger Assessment (symptoms of increased homicide risk) PTSD; depression (CESD-10); severity of IPV; mental quality-of-life;

Table 3 Relationship with the current partner and/or abusive partner ($n = 208$) (Haiti 2011–2013)

Variables	Frequency	Percent
Have a current partner		
No	76	36.5
Yes	132	63.5
Relationship with partner		
No response	24	11.5
Boy friend	79	38.0
Husband	68	32.7
Common law	30	14.4
Other	7	3.4
Living with partner		
No response	23	11.1
No	97	46.6
Yes	88	42.3
Relationship with abusive partner		
No response	19	9.1
Boy friend	49	23.6
Ex-boyfriend	23	11.1
Husband	59	28.4
Ex-husband	21	10.1
Partner (the same sex)	5	2.4
Ex-partner	6	2.9
Common law	18	8.6
Other	8	3.8
Living with abusive partner		
No response	17	8.2
No	84	40.4
Yes	107	51.4
Left abusive partner		
No response	19	9.1
No	68	32.7
Yes	121	58.2
Abusive partner employed		
No response	19	9.1
Never	53	25.5
Very seldom	62	29.8
Some of the time	27	12.0
Most of the time	25	12.0
All of the time	22	10.6

suicidal behavior and symptom clusters, including central nervous system (CNS); traumatic brain injury (TBI); gynecological; face and head injury; gastrointestinal; chronic stress; and cardiovascular.

Using the logistic regression analysis, Table 6 shows the adjusted odds ratio of the symptom clusters between those who reported being physically, psychologically, and/or sexually abused post-earthquake and those who reported no

abuse, controlling for age, education, marital status, income, and employment. The mental quality-of-life scores were not statistically significant. The odds of abused adult Haitian women post-earthquake increased with respect to the DA score by 29 % [100 (1.29–1); depression by 18 %; PTSD by 104 %; traumatic brain injury by 85 %; suicidal thoughts by 30 %; gastrointestinal symptoms by 30 %; and face and head injury by 25 %. The findings indicated smaller increases in gynecological symptoms (19 %); chronic stress (13 %); central nervous system symptoms (9 %); and severity of IPV (6 %). In addition, using the multiple regression analyses—with age; education; marital status; income; employment; and frequency and severity of IPV as the predictors and PTSD as the dependent variable—the overall relationship was statistically significant ($R^2 = 37\%$, $F = 8.37$, $p < 0.0001$). Results showed severity of IPV positively related to PTSD scores ($t = 6.92$, $p < 0.0001$) and PTSD scores increasing by 0.14 for every one-unit increase in severity of IPV score.

Table 7 provides cultural attitudes and beliefs regarding community tolerance for IPV and IPA in this sample. The majority of the 208 women did not indicate personal tolerance of violence against wives and girl friends. This was evident even under circumstances, such as the wife not completing household work to her husband's satisfaction (17.7 %) and refusing to have sex with him (19.4 %) (Table 7). Abused women indicated no higher tolerance for IPA than non-abused women with the following exceptions: It was indicated that IPA may be excused if: discovering female infidelity (35 % abused women versus 23 % of non-abused); female disobedience (33 versus 22 %); and in terms of the belief that it is important for a man to show his wife/girlfriend that he is the boss (62 % of abused women; 55 % of non-abused). Regarding community tolerance of abuse, a majority of the women, both abused and non-abused, indicated that family problems should only be discussed with family members (70 %), but that if a man mistreats his wife, others outside the family should intervene (68.6 %). However, the difference in percentages was not significantly different between abused women and non-abused women.

Discussion

The finding of a high prevalence of GBV in this study is consistent with the findings from other studies of internally displaced women following natural disasters (Anastario et al. 2009; Harville et al. 2011). The prevalence of GBV was found to be much higher than found in other population-based surveys conducted in Haiti pre-earthquake. The very small non-probability sample of displaced women makes it impossible to say if this prevalence is widespread

Table 4 Health status and physical activities pre- and post-earthquake, non-abused and abused women (Haiti 2011–2013)

Non-abused and abused Haitian women	Earthquake		<i>p</i> value
	Pre <i>n</i> (%)	Post <i>n</i> (%)	
Health and physical activities			
Self-reported health status			
No response	17 (8.2)	17 (8.2)	
Excellent	51 (24.5)	21 (10.1)	
Very good	7 (3.4)	3 (1.4)	
Good	14 (6.7)	7 (3.4)	<0.0001
Fair	71 (34.1)	70 (33.6)	
Poor	21 (10.1)	46 (22.1)	
Very poor	27 (13.0)	44 (21.2)	
Physical activity limitations			
No response	17 (8.2)	17 (8.2)	
Not at all	55 (26.4)	32 (15.4)	
Very little	60 (28.8)	57 (27.4)	0.074
Somewhat	27 (13.0)	34 (16.3)	
Quite a lot	24 (11.6)	33 (15.9)	
Could not do physical activities	25 (12.0)	35 (16.8)	
Physically, psychologically, or sexually abused haitian adult women			
Self-reported health status			
No response	10 (6.8)	10 (6.3)	
Excellent	27 (18.3)	10 (6.3)	
Very good	8 (5.4)	4 (2.5)	<0.0001
Good	11 (7.4)	4 (2.5)	
Fair	53 (35.8)	45 (28.5)	
Poor	19 (12.8)	40 (25.4)	
Very poor	20 (13.5)	45 (28.5)	
Physical activity limitations			
No response	10 (6.8)	10 (6.3)	
Not at all	38 (25.7)	20 (12.7)	
Very little	40 (27.0)	43 (27.2)	0.043
Somewhat	20 (13.5)	20 (12.7)	
Quite a lot	21 (14.2)	32 (20.2)	
Could not do physical activities	19 (12.8)	33 (20.9)	

or primarily among displaced women. Even so, the finding of no significant difference in the prevalence of GBV pre-earthquake versus post-earthquake in this sample is notable. In addition, noteworthy is the finding that the vast majority of the perpetrators of the violence, both physical and sexual, were intimate partners of the women. The majority of the perpetrators were not strangers roaming through the tent cities as often reported anecdotally in the aftermath of the earthquake. Instead, the women were abused by the same intimate partners and ex-intimate partners who abused them before the earthquake without a significant escalation.

The high proportion of this sample of women reporting abuse in Haiti may be related to the low levels of education and the high rates of unemployment. These are both found to be associated with IPV globally (Garcia-Moreno et al. 2006). However, only some areas of the world have such high rates despite the level of education. Such regions indicate lower status of women with equally rigid masculinity norms, regarding the acceptability of using violence against women (Gabriel et al. 2016). In terms of cultural attitudes supporting violence, although the majority of the women, in both, the abused and non-abused groups, did not express a personal tolerance for abuse,

Table 5 Difference in mean symptom scores between abused and non-abused Haitian adult women post-earthquake (Haiti 2011–2013)

Symptoms	Abused		Non-abused		<i>t</i> value	<i>p</i> value
	<i>N</i>	Mean (SD)	<i>N</i>	Mean (SD)		
Danger assessment score (DA)	124	9.04 (4.42)	67	5.97 (3.76)	4.80	<0.0001
Post-traumatic stress disorder (PC-PTSD)	124	3.43 (0.96)	67	2.09 (1.64)	7.14	<0.0001
Depression (CESD-10)	124	13.61 (5.96)	67	10.58 (5.120)	3.52	0.0005
Severity of IPV (SVAWS)	124	30.96 (18.87)	67	12.14 (15.00)	7.04	<0.0001
Physical quality-of-life (SF-8)	119	40.68 (6.52)	64	37.72 (6.44)	1.49	0.1405
Mental quality-of-life (SF 8)	119	48.78 (6.24)	64	44.51 (7.62)	2.12	0.0383
Suicidal	124	3.98 (3.06)	67	2.34 (2.33)	3.84	0.0002
Central nervous system (Mapsias)	124	13.54 (6.81)	67	10.39 (6.37)	3.13	0.0020
Traumatic brain injury (Mapsias)	124	2.27 (1.88)	67	0.94 (1.16)	2.46	0.0149
Gynecological (Mapsias)	124	10.68 (6.71)	67	7.02 (4.96)	3.92	0.0001
Face and Head Injury ((Mapsias)	124	2.87 (2.85)	67	1.58 (2.00)	3.29	0.0012
Gastrointestinal (Mapsias)	124	8.65 (3.34)	67	6.18 (3.18)	4.96	<0.0001
Chronic stress (Mapsias)	124	12.29 (4.26)	67	9.92 (4.37)	3.63	0.0004
Cardiovascular (Mapsias)	124	2.76 (2.27)	67	1.76 (1.91)	3.06	0.0026

Table 6 Adjusted odds ratio estimates of symptoms in abused vs. non-abused Haitian adult women post-earthquake (Haiti 2011–2013)

Symptoms	Odds ratio	95 % percent confidence limits		Percent increase
Women's Experience with Battering (WEB)	1.01	0.98	1.03	1
Danger Assessment Score (DA)	1.29	1.14	1.46	29
Post-Traumatic Stress Disorder (PTSD)	2.04	1.52	2.75	104
Depression (CESD-10)	1.18	1.07	1.29	18
Severity of IPV (SVAWS)	1.06	1.03	1.09	6
Physical Quality-of-Life (SF8)	0.91	0.79	1.04	-9
Mental Quality-of-Life (SF8)	1.04	0.96	1.12	4
Suicidal	1.03	1.11	1.53	30
Central Nervous System (Mapsias)	1.09	1.02	1.16	9
Traumatic Brain Injury (Mapsias)	1.85	1.39	2.47	85
Gynecological(Mapsias)	1.19	1.10	1.28	19
Face and Head Injury (Mapsias)	1.25	1.07	1.46	25
Gastrointestinal (Mapsias)	1.30	1.16	1.47	30
Chronic Stress (Mapsias)	1.13	1.04	1.24	13
Cardiovascular (Mapsias)	1.27	1.06	1.53	27

there were higher percentages of women overall who expressed such tolerance than in a sample in the USVI and in the US (Stockman et al. 2014). In contrast to the findings in the USVI, there was no significantly higher acceptability among the abused women than non-abused. These are the two situations most recently mentioned by women globally as excusing men for being violent toward women (Garcia-Moreno et al. 2006).

The strong associations of IPV with PTSD echo multiple other studies in the US and globally (Devries et al. 2011; Mechanic et al. 2008; Nathanson et al. 2012) but are the

first reported in Haiti. Although PTSD may have been a result of, or exacerbated by the earthquake, it was found significantly more often and more seriously among abused women with a dose response of severity and frequency of IPV. This supports the findings in other research that the more trauma a woman experiences (cumulative trauma) as well as the more severe the trauma, the greater the prevalence of PTSD (Pico-Alfonso 2005; Ribeiro et al. 2009). Maternal PTSD stress levels post-disaster have also been found to not only impact the woman, but her children as well (Self-Brown et al. 2014). There has been inadequate

Table 7 Beliefs, attitudes, and community tolerance of adult Haitian women about abuse post-earthquake (Haiti 2011–2013); from: World Health Organization (WHO) (Garcia-Moreno et al. 2006)

Beliefs and attitudes	Abused		<i>p</i> value
	No <i>n</i> (%)	Yes <i>n</i> (%)	
She does not complete her household work to his satisfaction			
No response	8 (10.7)	9 (6.8)	0.267
No	51 (68.0)	92 (69.2)	
Yes	8 (10.7)	24 (18.0)	
Do not know	8 (10.7)	8 (6.0)	
She disobeys him			
No response	8 (10.7)	9 (6.8)	0.128
No	44 (58.7)	77 (57.9)	
Yes	15 (20.0)	41 (30.8)	
Do not know	8 (10.7)	6 (4.5)	
She refused to have sex with him			
No response	8 (10.7)	9 (6.8)	0.740
No	55 (73.3)	99 (74.4)	
Yes	10 (13.3)	22 (16.5)	
Do not know	2 (2.7)	3 (2.3)	
She asks him whether he has other girlfriends			
No response	8 (10.7)	9 (6.8)	0.780
No	55 (73.3)	103 (77.4)	
Yes	9 (12.0)	16 (12.0)	
Do not know	3(4.0)	5 (3.8)	
He suspects that she is unfaithful			
No response	8 (10.7)	9 (6.8)	0.560
No	40 (53.3)	81 (60.9)	
Yes	18 (24.0)	32 (24.0)	
Do not know	9 (12.0)	11 (8.3)	
He finds out that she has been unfaithful			
No Response	8 (10.7)	9 (6.8)	0.301
No	44 (58.7)	69 (51.9)	
Yes	16 (21.3)	44 (33.0)	
Don't know	7 (9.3)	11 (8.3)	
Family problems should only be discussed with family members			
No response	8 (10.7)	9 (6.8)	0.377
No	18 (24.0)	23 (17.3)	
Yes	48 (64.0)	97 (72.9)	
Don't know	1 (1.3)	4 (3.0)	
It is important for a man to show his wife/partner who is the boss			
No response	8 (10.7)	10 (7.5)	0.654
No	25 (33.3)	37 (27.8)	
Yes	37 (49.3)	76 (57.2)	
Do not know	5 (6.7)	10 (7.5)	

Table 7 continued

Beliefs and attitudes	Abused		<i>p</i> value
	No <i>n</i> (%)	Yes <i>n</i> (%)	
A woman should be able to choose her own friends even if her husband disapproves			
No response	8 (10.7)	10 (7.5)	0.552
No	45 (60.0)	73 (54.9)	
Yes	19 (25.3)	40 (30.1)	
Do not know	3 (4.0)	10 (7.5)	
It's a wife's obligation to have sex with her husband even if she doesn't feel like it			
No response	8 (10.7)	9 (6.8)	0.646
No	44 (58.7)	80 (60.1)	
Yes	21 (28.0)	37 (27.8)	
Do not know	2 (2.7)	7 (5.3)	
If a man mistreats his wife, others outside of the family should intervene			
No response	8 (10.7)	9 (6.8)	0.658
No	20 (26.7)	32 (24.1)	
Yes	45 (60.0)	86 (64.6)	
Do not know	2 (2.7)	6 (4.5)	

investigation into this area, which is another limitation of this study. This reinforces the need for brief interventions following a natural disaster delivered by trained health workers for PTSD. This care can especially be helpful in low-income settings for persons experiencing violence and may benefit their children who may have the symptoms of traumatic stress (Rezaejan 2013; Self-Brown et al. 2014).

It is also important that perceived physical health status and activities of daily living decreased for all women both pre- and post-earthquake, but that the abused women perceived their health to be even lower than the non-abused women both before and after. Although symptoms indicating health consequences have previously been associated with abuse, it is noteworthy that these associations held even in a setting where there are multiple other causes of health problems. The increased adjusted odds of 1.84 of traumatic brain injury from multiple head injuries and/or strangulation from abuse are particularly noteworthy.

Strengths and limitations of the study

Conducting situational analysis prior to the research enabled the research team to experience Haiti from a much more emic perspective. This prior analysis gave researchers an advantage over beginning the study in the middle of a devastating situation and where researchers may have

imposed values about coping and surviving. The major limitations are sample size and sampling procedures. These make it difficult to assess that GBV prevalence is widespread throughout Haiti or limited to this sample of displaced women coming to the clinic.

Nonetheless, the post-earthquake abuse these women reported does not appear to be significantly greater than prior to the earthquake. Asking them to report abuse prior to the earthquake is an important addition to the literature. Although self-report data are always subject to recall bias, this has been the way prevalence has been estimated all over the world because the observation of IPV is not always possible. Finally, while the MAPSAIS measures injuries previously associated with IPV, and asks if those injuries are a result of IPV, it does not collect injury data on other forms of IPV or about injuries from other problems, such as the earthquake.

Recommendations

Additional studies are needed that are culturally sensitive and adapted to help clarify the post-disaster effects and interventions that could reduce the long-term anxiety, depression, and PTSD observed in women who survive a natural disaster. Epidemiological studies should be extended over a period of time. This should allow for examining relationships between exposure to a natural disaster and

being a victim of violence; the type and magnitude of the disaster; moderating and confounding variables; and integrated violence surveillance systems (Rezaejan 2013). To foster trust, confidence, and respect during disaster relief, healthcare providers can engage with local health and service providers. It may be beneficial to use approaches that prevent abuse and exploitation when caring for victims of intimate partner or non-partner physical and sexual violence. Addressing the physical and mental health problems resulting from abuse may also prove helpful. Plans should be developed to address needs during the acute phase of the disaster and during recovery. These plans should be integrated into humanitarian and emergency relief guidelines (Mikton et al. 2015).

Finally, balanced healthcare for women after natural disasters should include sensitivity to the abusive experiences that many of the women have suffered, including attention to privacy and security during sensitive examinations and treatments. Effective inter-organization communication and resource sharing may improve healthcare post-disasters.

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Compliance with ethical standards

Ethical approval This study involved human participants. All procedures performed in this study were in compliance with the institutional and national committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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