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Intimate partner violence and Hurricane Katrina: Predictors and associated mental health outcomes

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Abstract

This study sought to establish the prevalence and correlates of intimate partner violence (IPV) victimization in the six months before and after Hurricane Katrina. Participants were 445 married or cohabiting persons who were living in the 23 southernmost counties of Mississippi at the time of Hurricane Katrina. Data for this study were collected as part of a larger, population-based, representative study. The percentage of women reporting psychological victimization increased from 33.6% prior to Hurricane Katrina to 45.2 % following Hurricane Katrina ($p < 0.001$). The percentage of men reporting psychological victimization increased from 36.7% to 43.1% ($p = 0.01$). Reports of physical victimization increased from 4.2% to 8.3% for women ($p = .01$), but were unchanged for men. Significant predictors of post-Katrina victimization included pre-Katrina victimization, age, educational attainment, marital status and hurricane-related stressors. Reports of IPV were associated with greater risk of post-Katrina depression and posttraumatic stress disorder. Data from the first population-based study to document IPV following a large scale natural disaster suggest that IPV may be an important, but often overlooked public health concern following disasters.

Intimate partner violence and Hurricane Katrina: Predictors and associated mental health outcomes Intimate partner violence (IPV) has long been identified as an important public health concern. The term IPV refers broadly to physical aggression and threats of physical aggression as well as a wide range of psychologically abusive or controlling behaviors perpetrated against a current or former intimate partner. Estimates from a nationally representative U.S. survey of married, formerly married, and cohabiting men and women suggest that each year up to 13.6% of women and 18.2% of men experience physical aggression at the hands of a marital or cohabiting partner (Schafer, Caetano & Clark, 1998). Findings from a prospective cohort study of married and cohabiting adults in a rural county revealed that 2.9% of women and 4.7% of men reported severe physical victimization by a partner and 46.7% of the women and 30.2% of the men reported experiencing emotional

abuse perpetrated by their partner in the past year (Murty et al., 2003). Both men and women who report having been victims of IPV are more likely to report a range of physical and mental health symptoms and disorders (Coker et al., 2002).

Although stressful life circumstances have been identified as a risk factor for IPV perpetration (Schumacher, Feldbau-Kohn, Slep, & Heyman, 2001) and natural disasters often precipitate numerous life stressors for residents of affected areas (Norris & Uhl, 1993), little is known about how the population prevalence of IPV is influenced by disasters. We are aware of only two studies that have explored IPV in the context of disasters. Using a participatory action research approach, Frasier and colleagues (2004) examined IPV in regions of North Carolina affected by Hurricane Floyd and the subsequent flooding. Participants were 785 women employed at 12 work sites identified through the *North Carolina Manufacturing Directory*. This study did not find a relation between the flood and IPV, but did find that IPV victims reported greater stress, post-traumatic stress symptoms and psychological distress than non-victims regardless of their flood experience. Enarson and colleagues combined a mail survey and telephone interview of representatives from 77 Canadian and U.S. domestic violence agencies in areas affected by natural disasters. The study found that those agencies in areas most severely affected by disasters reported increased service demands persisting for up to 1 year following the disaster (Enarson, 1999).

More recently, Hurricane Katrina inflicted substantial damage and disruption on the Gulf Coast region of the United States and was the costliest natural disaster in U.S. history. Hurricane Katrina made landfall in the Gulf Coast on August 29, 2005. The 28-foot storm surge and accompanying 55-foot sea waves were the highest ever recorded in America (Knabb, Rhome, & Brown, 2006). In total, over the next few days, 485,000 residents of Louisiana and Mississippi were evacuated. The size of the region declared a disaster area after Hurricane Katrina made landfall was larger than the land mass of the United Kingdom. More than 122,000 people were housed in temporary shelters throughout the United States and, as of May 2009, 2,000 families in Mississippi were still living in housing (e.g., trailers, motel rooms) provided or subsidized by the Federal Emergency Management Agency (Chandler, May 2, 2009).

The present study sought to establish the prevalence and correlates of IPV in a population-representative sample of residents of Mississippi before and after the hurricane. We also aimed to assess whether IPV victimization was associated with poorer mental health among residents of Mississippi.

Methods

Participants

The data for this study were collected as part of a larger, population-based, representative study of persons living in the 23 southernmost counties of Mississippi prior to Hurricane Katrina. The sampling strategy is described in detail in an earlier publication (Galea et al., 2008). Briefly, our sampling frame of interest was adults (18 years of age or older) who were living in the 23 southernmost counties of Mississippi prior to Hurricane Katrina. Substantial efforts were undertaken to account for and identify all housing units that existed prior to the hurricane (see Galea et al., 2008 for a complete description of the sampling frame and means of locating household members from selected addresses). For counties that received more extensive damage, an area probability sampling frame was created through systematic numbering of all addresses in 64 randomly selected segments (consisting of aggregations of 2000 Census blocks). A random selection of addresses was then sampled within each segment. In counties with less extensive damage, a random digit dial sampling frame was used to sample potential respondents. Interviews were conducted using a

computer-assisted interview system. Interviews took place between February 24, 2007 and July 31, 2007 and lasted 37 minutes on average. Interviews were conducted by a combined team of highly experienced epidemiological survey interviewers and seven local interviewers (i.e., Mississippi residents) who underwent 3 days of training in general interviewing techniques and 2.5 days of study specific training followed by testing and certification. After a complete description of the study was provided to the participants, oral informed consent was obtained. This study was approved by an Institutional Review Board and respondents were compensated for their time.

As further detailed in Galea et al. (2008), the refusal rate for this study was only 9.4% and a total of 50.3% of eligible sample households completed interviews resulting in a sample of 810 respondents. The sample was representative of the 2000 U.S. Census population in the study area after application of weights. A recent review of participation rates in epidemiological research indicates that the participation rates in this study are better than those achieved in most population-based studies conducted under comparably difficult conditions (Galea & Tracy, 2007). Of the 810 respondents, 445 indicated their marital status was married ($n = 416$) or cohabiting ($n = 29$) at the time of the interview. The data from those 445 married or cohabiting participants were analyzed for the current study. These respondents identified their race primarily as White (83.3%; $n = 369$) or Black/African American (14.6%; $n = 52$) with the remaining participants identified as Native American, Asian, mixed race, other, or unknown. The majority of respondents identified their ethnicity as non-Hispanic (99%; $n = 438$). Among the 399 respondents who provided information about their annual household income, 43.1% ($n = 150$) reported less than \$40k, 20.2% ($n = 87$) reported \$40–\$59k, and 36.7% ($n = 162$) reported \$60k or greater. Additional descriptive information for the sample is presented in Table 1.

Measures

IPV in the 6 months before and the 6 months after Hurricane Katrina was assessed with a series of 4 items presented in Table 2. For the purpose of establishing prevalence estimates, items were coded dichotomously as victimization present and victimization absent. In analyses predicting post-hurricane psychopathology, the pre- and post-hurricane victimization variables for each type of IPV were collapsed into 2 variables: one variable indicated whether a respondent reported any psychological IPV victimization during the period from 6 months prior to Hurricane Katrina to 6 months following Hurricane Katrina, and the second variable indicated whether a respondent reported any physical IPV victimization during that time period.

The impact of Hurricane Katrina on respondents was assessed with an 8 item scale comprising items modified from scales used after other natural disasters (e.g., Riad & Norris, 1996). Respondents were asked whether they had been displaced from home, lost sentimental possessions such as photographs or experienced any of six stressors in the 6 months after the hurricane (e.g., shortage of food or water, difficulty finding sufficient housing). Items were summed to create a total stressful life events score ranging from 0 to 8 (Cronbach's $\alpha = 0.75$).

Posttraumatic stress disorder related to Hurricane Katrina was measured using the PTSD module of the *Composite International Diagnostic Interview* for the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (CIDI; Kessler & Ustun, 2004). CIDI items were modified, so that each symptom was assessed specifically in reference to Hurricane Katrina (e.g., “Did you keep remembering Katrina even when you didn’t want to?”). Consistent with DSM-IV criteria, respondents were diagnosed with PTSD if they reported feeling “terrified” or “helpless” when Hurricane Katrina happened and they reported one or more reexperiencing symptom, three or more avoidance symptoms, and two

or more arousal symptoms persisting at least one month and interfering significantly with their life or activities. Respondents were categorized as having met or not having met DSM-IV criteria for PTSD subsequent to Hurricane Katrina.

Depression was assessed with the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001; Kroenke and Spitzer, 2002). The PHQ-9 instrument consists of 9 items, which have a one-to-one correspondence with DSM-IV-TR diagnostic criteria for major depressive disorder (APA, 2000). Respondents were asked to indicate how often they were bothered by each symptom since Hurricane Katrina, using four response options ranging from “not at all” to “nearly every day,” and whether the symptoms endorsed occurred within the same 2 week period. To determine whether respondents met the impairment criterion for depression diagnosis, they were asked how difficult the symptoms they endorsed made it for them to “work, take care of things at home, or get along with other people” using 4 response options ranging from “not difficult at all” to “extremely difficult.” As with PTSD, respondents were categorized as having met or not having met DSM-IV criteria for major depressive disorder since Hurricane Katrina.

Data Analysis

The characteristics of the sample, including sociodemographic variables and variables related to hurricane exposure were examined. Analyses to determine whether there was a change in the prevalence of self-reported IPV victimization experiences before and after Hurricane Katrina were conducted using McNemar’s tests. For McNemar’s tests in which more than 25 cases changed status from pre-post Hurricane Katrina, a chi-square statistic was calculated. For McNemar’s tests in which fewer than 25 cases changed status from pre-post hurricane, the binomial distribution was used to calculate the p -value associated with the test. Multivariable, binary logistic regression analyses were conducted to identify significant predictors of IPV in the 6 months following Hurricane Katrina. Multivariable logistic regression analyses were also conducted to examine IPV as a predictor of PTSD and depression. Potential sex differences in the association of hurricane-related stressors with post-Katrina IPV and in the association of IPV with PTSD and depression were examined by adding interaction terms to the models. To enable interpretation of significant interaction terms in the models predicting post-Katrina IPV, beta coefficients and odds were calculated from parameter estimates for hurricane stressor scores at the 10th percentile (0), median (2), and 90th percentile (6) for both men (0) and women (1). Logistic regression models were run using SAS 9.1. All other analyses were conducted using SPSS 16.0.

Analyses were weighted to account for differential probability of selection within households, sampling probabilities, and to account for demographic differences reported in the 2000 U.S. Census (Bureau of the Census, 2000). Prevalence estimates and sample descriptives are presented as raw numbers and weighted percentages in both the text and Table 1. All findings of chi-square and logistic regression analyses are presented as weighted values.

Results

Prevalence of IPV

McNemar test comparisons of women’s reports of psychological and physical IPV experiences during the six months before and following Hurricane Katrina revealed a significant increase in the prevalence of both forms of IPV following the hurricane. As shown in Table 1, eighty-nine women (33.6%) reported experiencing psychological IPV in the six months prior to the hurricane, whereas 111 (45.2%) reported this form of IPV in the six months following the hurricane, $X^2(1, n = 212) = 16.53, p < 0.001$. With regard to

physical IPV, 11 women (4.2%) reported such experiences before the hurricane and 17 women (8.3%) reported such experiences following the hurricane, $p = 0.01$ (binomial distribution used to compute the p-value). Hence there was a 35% increase in the prevalence of psychological victimization of women and a 98% increase in the prevalence of physical victimization of women from pre- to post-Katrina. Examination of men's IPV experiences before and after the hurricane revealed a significant increase in psychological victimization, but no change in physical victimization. Sixty men (36.7%) reported experiencing psychological aggression in the 6 months prior to the hurricane and 72 (43.1%) reported experiencing this form of IPV in the six months following the hurricane, $X^2(1, n = 252) = 6.25, p = 0.01$. Eighteen men (11.7%) reported experiencing physical IPV in the 6 months before the hurricane, compared with 21 (10.9%) following the hurricane, $p = 0.77$ (binomial distribution used to compute the p-value).

Incidence and Desistance of IPV Experiences—Patterns of incidence and desistance of self-reported IPV victimization were also examined. With regard to psychological IPV, among those reporting no psychological victimization in the six months prior to the hurricane, 27 women (19.4%) and 19 men (15.9%) reported experiencing this form of IPV in the 6 months following the hurricane. Among those reporting psychological IPV in the 6 months prior to the hurricane, only 5 women (4.1%) and 7 men (9.9%) reported that none had occurred in the 6 months following the event. Reports of physical IPV victimization in the 6 months following the hurricane by those who reported no such occurrences in the 6 months prior to the hurricane were less common; 9 women (4.8%) and 7 men (2.3%). Regarding desistance of physical victimization, 4 men (24%) and 3 women (11%) who reported physical IPV prior to the hurricane reported no occurrences following the hurricane.

Prediction of IPV following Hurricane Katrina—Two multivariable logistic regression analyses predicting post-Katrina psychological and physical IPV, respectively, were conducted. Age, education, marital status, sex, pre-Katrina psychological and physical IPV, and the experience of hurricane-related stressors were entered as covariates. A test of the full model with all 7 predictors against a constant only model was statistically reliable for both psychological, $X^2(7, n = 439) = 299.75, p < 0.001$, and physical IPV $X^2(7, n = 439) = 153.79, p < 0.001$, indicating that the predictors, as a set, reliably distinguished between those who reported post-Katrina IPV and those who did not. The models were then re-run with addition of a sex $\times$ hurricane stressors interaction term added as a covariate. Again, a test of the full model with all 8 predictors against a constant only model was statistically reliable for both psychological, $X^2(8, n = 439) = 300.59, p < 0.001$, and physical IPV $X^2(8, n = 439) = 160.65, p < 0.001$.

As shown in Table 3, several of the covariates in the initial run of the model (without the interaction term) were significantly associated with post-Katrina psychological victimization, including age [odds ratio (OR) = 0.98, 95% confidence interval ($95\% CI$) = 0.96–1.00], marital status (OR = 5.48, $95\% CI$ = 1.41–21.35), education (OR = 0.45, $95\% CI$ = 0.23–0.86), pre-Katrina psychological victimization (OR = 66.98, $95\% CI$ = 32.21–139.27), and hurricane related stressors (OR = 1.22, $95\% CI$ = 1.07–1.40). Thus, being younger, married (as opposed to cohabiting, but not married), having less than a high school diploma, reporting pre-Katrina psychological victimization, and a greater number of hurricane-related stressors were associated with increased risk for post-Katrina psychological IPV victimization. In the second run of the model, the sex $\times$ hurricane related stressor interaction term was not a significant predictor of post-Katrina psychological IPV. In contrast, the second run of the model predicting physical aggression revealed that the sex $\times$ hurricane related stressors interaction term was a significant predictor of post-Katrina physical IPV, as were pre-Katrina psychological (OR = 3.71, $95\% CI$ = 1.34–10.26) and

physical victimization ($OR = 68.75$, $95\% CI = 20.62-229.24$). To interpret the significant interaction, the odds ratios associated with no hurricane related stressors (10th percentile), 2 hurricane stressors (median), and 6 hurricane stressors (90th percentile) for men and women were examined. Only the odds ratio for women with a hurricane stressor score at the 90th percentile was statistically significant ($OR = 8.23$, $95\% CI = 2.09-32.40$) compared to men with no hurricane stressors. This suggests that the significant sex $\times$ hurricane related stressors interaction observed in this model is largely reflective of a substantially increased risk for physical IPV victimization among women who experience a substantial number of hurricane related stressors, an increase that is not observed for men who experience a comparably large number of stressors.

IPV and Psychopathology following Hurricane Katrina

To examine whether reports of psychological and physical IPV were associated with PTSD or depression, we first conducted two logistic regressions predicting Katrina-related PTSD and post-Katrina depression. Sex, psychological IPV, and physical IPV were entered as covariates. For these analyses, IPV was operationalized as any IPV occurring in the 6 months before or after Katrina. Results of these analyses are presented in Table 4. The full model predicting Katrina-related PTSD was statistically reliable $X^2(3, n = 443) = 33.55$, $p < 0.001$. Examination of the confidence intervals associated with each of the covariates revealed that both psychological ($OR = 2.58$, $95\% CI = 1.42-4.68$) and physical IPV ($OR = 3.27$, $95\% CI = 1.71-6.27$) were significantly associated with Katrina-related PTSD, indicating that IPV victimization was associated with greater risk for post-Katrina PTSD. The full model predicting post-Katrina depression was also statistically reliable $X^2(3, n = 443) = 28.14$, $p < 0.001$. Only physical victimization emerged as a significant covariate in this analysis ($OR = 10.35$, $95\% CI = 3.97-26.99$). To determine whether there were sex differences in the role of IPV as a risk factor for PTSD and depression, the models were run a second time with sex $\times$ psychological IPV and sex $\times$ physical IPV interaction terms included as covariates. Although the model for PTSD remained statistically reliable $X^2(5, n = 443) = 35.94$, $p < 0.001$, according to the Wald statistics, neither the sex $\times$ psychological IPV, $X^2(1, n = 443) = 1.97$, $p = 0.161$, nor the sex $\times$ physical IPV interaction terms, $X^2(1, n = 443) = 0.02$, $p = 0.885$ reliably predicted Katrina-related PTSD. Thus, there were no sex differences in the prediction of PTSD. The full model predicting post-Katrina depression was also statistically reliable $X^2(5, n = 443) = 28.66$, $p < 0.001$, but again, neither of the interaction terms was a significant predictor of post-Katrina depression according to the Wald criterion, $X^2(1, n = 443) = 0.10$, $p = 0.753$ and $X^2(1, n = 443) = 0.16$, $p = 0.690$, respectively. Full results of the models containing the interaction terms are not presented.

Discussion

The present study sought to examine the prevalence and correlates of intimate partner violence (IPV) before and after Hurricane Katrina among residents living in the lower 23 counties of Mississippi on the date the hurricane occurred. There was a 35% increase in the prevalence of psychological victimization and a 98% increase in physical victimization for women. For men, there was a 17% increase in psychological victimization from pre- to post-Katrina, but no change in the prevalence of physical IPV victimization from pre- to post-hurricane. Although these increases in IPV prevalence are startling, they are in keeping with the magnitude of impact this unprecedented natural disaster had on other public health outcomes. For example, earlier findings from this study documented a prevalence of Katrina-related PTSD with impairment of 15.5% in the full sample (Galea et al., 2008). Other post-Katrina population-based studies (e.g., Kessler et al., 2008) also reported considerably higher rates of PTSD compared to reports from other natural disasters

(Cao,McFarlane, & Klimidis, 2003; Carr et al., 1995; Kaiser, Sattler, Bellack, & Dersin, 1996; Shannon, Lonigan, Finch,&Taylor, 1994).

This is the first population-based study to attempt to document the prevalence of IPV in a region before and after a major natural disaster. Our finding of increased victimization of women after the hurricane is consistent with reports of increased demand for services at domestic violence programs following disasters (Enarson, 1999). It is also generally consistent with the finding of Cohan and Cole (2002) that birth, marriage, and divorce rates in South Carolina counties declared disaster areas following Hurricane Hugo increased relative to counties that did not receive this designation. Cohan and Cole's findings suggest that large-scale disasters can have profound effects, both positive and negative, on couples' functioning. Our findings are inconsistent, however, with those of Frasier and colleagues (2004), who examined reports of IPV victimization among women in manufacturing jobs in Eastern North Carolina before and after Hurricane Floyd and the subsequent floods. Frasier and colleagues found no change in women's reports of IPV from pre- to post-disaster. This discrepancy likely reflects the combined effects of differences in the sampling frames for the two studies and differences in magnitude of the disasters under study. Future representative surveys will be crucial to understanding what types of disasters are associated with increased risk for IPV and for whom.

In our examination of predictors of post-hurricane IPV, we found that pre-hurricane experiences of IPV were the strongest predictors of post-hurricane IPV for both physical and psychological IPV. Age, education, and marital status also emerged as significant predictors of post-hurricane psychological victimization, but not physical victimization. Hurricane related stressors were associated with increased risk for psychological IPV victimization for both men and women. Thus it appears that persons who experience greater direct impacts of natural disasters (e.g., those who experience displacement, housing and food shortages, and other post-event stressors) may be at heightened risk for psychologically abusive conflict in their relationships and should perhaps be targeted for interventions. We also found that the experience of numerous hurricane related stressors was associated with substantially increased risk for post-Katrina physical IPV for women, but not for men. This finding, which is consistent with Enarson's (1999) findings that domestic violence agencies in the areas most severely affected by disasters evidenced the greatest increases in domestic violence service utilization, suggests that enhancing existing gender-based services for victims of physical IPV (i.e., battered women's shelters) in the regions most affected by natural disasters may be warranted.

We found that physical and psychological victimization were associated with hurricane-related PTSD but that only physical victimization was associated with increased risk for post-hurricane depression. This is generally consistent with Frasier and colleagues (2004) who found an association between pre-flood IPV victimization and psychological problems and PTSD in their sample of blue collar women living in regions impacted by Hurricane Floyd and the subsequent floods. Our findings are also consistent with evidence in the literature that IPV victimization is associated with increased risk for depression and PTSD (Briere & Jordan, 2004; Coker, Watkins, Smith, & Brandt, 2003; Golding, 1999).

Limitations

Although the findings of this study make an important contribution to our understanding of how natural disasters may impact IPV, they must be interpreted in light of study limitations. First, our assessment of IPV was limited to 4 items. The brevity of the instrument did not allow for an examination of IPV severity, may have negatively affected measurement reliability, and may also have led to underreporting relative to longer IPV assessment instruments, such as the widely used Conflict Tactics Scales (Straus, 1979). With regard to

underreporting of IPV, however, the use of telephone interviewing and behaviorally specific wording may have enhanced accuracy of responses, offsetting some of the negative effects of measure brevity on reporting (Clements, Schumacher, Connolly, & Coffey, 2007; Lawrence, Heyman, & O'Leary, 1995; O'Leary, Vivian & Malone, 1992). Additionally, the estimates of physical and psychological IPV prior to Hurricane Katrina are reasonably commensurate with those established in other research (Murty et al., 2003; Schafer et al., 1998), and are actually considerably higher than the estimates of physical IPV established in the National Violence Against Women Survey (Tjaden & Thoennes, 2000). A second limitation is that the items only asked about victimization; collection of information about perpetration would have provided a better sense of the nature of the IPV occurring in the respondent's relationship (i.e., bilateral versus unilateral; Johnson & Ferraro, 2000). A third limitation is that participants were asked to retrospectively report their IPV victimization both before and after Katrina, which may have led to greater recall bias in responding (Coughlin, 1990). For example, respondents who were experiencing psychological distress at the time of the interview may have been more likely to recall victimization experiences or to label ambiguous conflict situations as psychologically abusive. This would artificially elevate the association between these two constructs. A fourth, important limitation is that pre-Katrina psychopathology was not controlled in the analyses predicting post-Katrina pathology. This limitation is particularly important with regard to depression, as PTSD diagnoses were specifically related to the trauma of Hurricane Katrina, whereas depression diagnoses were not. A fifth limitation is that although interviewers were highly trained, and the interview instrument highly structured, diagnostic interviews were not conducted by clinicians. A final important limitation is the large confidence intervals associated with some odds ratios, particularly pre-Katrina physical and psychological victimization as predictors of post-Katrina victimization. An examination of the correlations among predictors indicates that these large confidence intervals are likely not due to problems with collinearity. Pre-Katrina physical and psychological IPV were the most highly correlated predictors, but the phi value for this correlation was only .36. Nonetheless, given these large confidence intervals, the absolute value of these estimates should be interpreted very tentatively.

Implications and Future Directions

The findings of this study have important implications for intervention efforts following large-scale disasters. First, the findings suggest that information about IPV resources should be disseminated to affected populations, so that women and men who experience IPV for the first time following a disaster will know where to turn for help and information. Similarly, shelters, hotlines, and other existing resources should be appropriately staffed to handle a potential influx of inquiries (Enarson, 1999). Members of the clergy, mental health practitioners, and medical providers should also be provided with resources to assist individuals who present with IPV-related concerns, as all of these provider-types are likely to be utilized for mental health needs in the wake of a large-scale disaster (Boscarino, Adams, & Figley, 2004). Additionally, providers who treat disaster survivors for other mental health problems should assess IPV victimization as it may impact treatment (Mechanic, 2004).

Although this study focused only on residents of Mississippi in the wake of Hurricane Katrina, the current study provides compelling evidence that risk for IPV is increased following large-scale disasters. Future post-disaster research may fruitfully continue to assess IPV to help us more fully understand the broad health impact (beyond diagnosable disorders) of large scale disasters. Such research should also focus on identifying risk and protective factors for IPV following disasters, which may inform the development of individual- and population-based interventions that can minimize IPV after these events.

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Table 1

Sample Description

Characteristic	Men (<i>n</i> = 194)		Women (<i>n</i> = 251)	
	<i>n</i>	Weighted % or Mean(SD)	<i>n</i>	Weighted % or Mean(SD)
Marital Status				
Married	178	89.3%	238	95.6%
Cohabiting	16	10.7%	13	4.4%
Age		49.84(15.72)		48.95(14.82)
Education				
<High School Diploma	29	27.1%	26	16.5%
High School Diploma/GED or Higher	165	72.9%	223	83.5%
Number of Hurricane Related Stressors		2.49(2.20)		2.27(2.18)
Psychological IPV Victimization				
During 6 Months before Hurricane	60	36.7%	89	33.6%
During 6 Months following Hurricane	72	43.1%	111	45.2%
Physical IPV Victimization				
During 6 Months before Hurricane	18	11.7%	11	4.2%
During 6 Months following Hurricane	21	10.9%	17	8.3%
Post Traumatic Stress Disorder				
Diagnostic Criteria Met	25	14.3%	37	14.6%
Diagnostic Criteria not Met	169	85.7%	214	85.4%
Depression				
Diagnostic Criteria Met	11	5.6%	17	6.1%
Diagnostic Criteria not Met	183	94.4%	234	93.9%

Note. IPV = Intimate Partner Violence

Table 2

Items used to assess intimate partner violence (IPV)

1	In the past six months, how often did a partner or spouse yell at you or say things to you that made you feel bad about yourself, embarrass you in front of others, or frightened you?
2	In the past six months, how often did a partner or spouse do things like push, grab, hit, slap, kick, or throw things at you during an argument or because he or she was angry with you?
3	Now I am going to ask you some questions about circumstances that may have been present in your life in the <i>six months before Hurricane Katrina</i> . In the six months before Katrina, how often did a partner or spouse yell at you or say things to you that made you feel bad about yourself, embarrassed you in front of others, or frightened you?
4	In the six months before Katrina, how often did a partner or spouse do things like push, grab, hit, slap, kick, or throw things at you during an argument or because he or she was angry with you?

Note: Respondents were asked to respond using one of the following 5 response choices: never = 1, almost never = 2, sometimes = 3, fairly often = 4, and very often = 5.

Table 3

Multivariable Binary Logistic Regression Analyses Predicting Psychological and Physical Intimate Partner Victimization (IPV) following Hurricane Katrina with and without a Sex $\times$ Hurricane Stressor Interaction Term

Prediction of Post-Katrina Psychological IPV								
Variables	Beta	OR*	95% CI	P	Beta	OR*	95% CI	P
Age	-0.02	0.98	0.96-1.00	0.019	-0.02	0.98	0.96-1.00**	0.024
Marital Status								
Cohabiting	0.00	1.00	--	0.014	0.00	1.00	--	0.014
Married	1.70	5.48	1.41-21.35		1.73	5.64	1.43-22.29	
Education								
No high school diploma or GED	0.00	1.00	--	0.017	0.00	1.00	--	0.018
High school diploma/GED or more	-0.81	0.45	0.23-0.86		-0.80	0.45	0.23-0.87	
Sex								
Male	0.00	1.00	--	0.155	0	1.00	--	n/a
Female	0.41	1.51	0.86-2.65		0.73	n/a	n/a	
Pre-Katrina Psychological IPV								
No victimization experiences	0.00	1.00	--	<0.001	0.00	1.00	--	<0.001
One or more victimization experiences	4.20	66.98	32.21-139.27		4.22	67.71	32.45-141.31	
Pre-Katrina Physical IPV								
No victimization experiences	0.00	1.00	--	0.165	0.00	1.00	--	0.173
One or more victimization experiences	1.08	2.93	0.64-13.36		1.06	2.89	0.63-13.31	
Hurricane Stressors	0.20	1.22	1.07-1.40	0.004	0.27	n/a	n/a	n/a
Hurricane Stressors × Sex								
Male, 10 th percentile stressors					-0.12			0.359
Male, median stressors					0.00	1.00	--	
Male, 90 th percentile stressors					0.53	1.70	1.15-2.51	
Female, 10 th percentile stressors					1.59	4.93	1.54-15.78	
Female, median stressors					0.73	2.08	0.85-5.08	
Female, 90 th percentile stressors					1.02	2.76	1.25-6.10	
Female, 90 th percentile stressors					1.59	4.89	1.70-14.06	

Prediction of Post-Katrina Physical IPV

Variables	Beta	OR*	95% CI	p	Beta	OR*	95% CI	p
Age	-0.01	0.99	0.96-1.02	0.522	-0.02	0.98	0.95-1.02	0.267
Marital Status								
Cohabiting	0.00	1.00	--	0.773	0.00	1.00	--	0.409
Married	-0.20	0.82	0.21-3.23		-0.58	0.56	0.14-2.21	
Education								
No high school diploma or GED	0.00	1.00	--	0.658	0.00	1.00	--	0.371
High school diploma/GED or more	-0.25	0.78	0.26-2.36		-0.51	0.60	0.20-1.84	
Sex								
Male	0.00	1.00	--	0.074	0.00	1.00	--	n/a
Female	0.91	2.49	0.91-6.78		-0.90	n/a	n/a	
Pre-Katrina Psychological IPV								
No victimization experiences	0.00	1.00	--	0.016	0.00	1.00	--	0.012
One or more victimization experiences	1.20	3.33	1.26-8.85		1.31	3.71	1.34-10.26	
Pre-Katrina Physical IPV								
No victimization experiences	0.00	1.00	--	<0.001	0.00	1.00	--	<0.001
One or more victimization experiences	3.90	49.60	16.18-152.04		4.23	68.75	20.62-229.24	
Hurricane Stressors	0.27	1.31	1.07-1.60	0.008	-0.06	n/a	n/a	n/a
Hurricane Stressors × Sex					0.57			0.013
Male, 10 th percentile stressors					0.00	1.00	--	
Male, median stressors					-0.13	0.88	0.46-1.68	
Male, 90 th percentile stressors					-0.39	0.68	0.10-4.70	
Female, 10 th percentile stressors					-0.90	0.41	0.07-2.36	
Female, median stressors					0.10	1.11	0.27-4.63	
Female, 90 th percentile stressors					2.11	8.23	2.09-32.40	

Note. p = Wald p -value, 95% CI = 95% confidence interval, IPV = Intimate Partner Violence Victimization.

* Odds ratios (OR) are not given for variables included in interaction terms nor the overall interaction as these odds ratios are not directly interpretable.

** Confidence interval appears non-significant due to rounding. Actual values are .959-.997.

Table 4
Binary Logistic Regression Analyses Predicting PTSD & Depression following Hurricane Katrina

Variables	Katrina-Related PTSD					Post-Katrina Depression				
	Beta	OR	95% CI	P	Beta	OR	95% CI	P		
Sex										
Male	0.00	1.00	--	0.554	0.00	1.00	--	0.529		
Female	0.16	1.18	0.69–2.00		0.26	1.30	0.57–2.95			
Psychological IPV										
No victimization experiences	0.00	1.00	--	0.002	0.00	1.00	--	0.953		
One or more victimization experiences	0.95	2.58	1.42–4.68		–0.03	0.97	0.36–2.60			
Physical IPV										
No victimization experiences	0.00	1.00	--	<0.001	0.00	1.00	--	<0.001		
One or more victimization experiences	1.19	3.27	1.71–6.27		2.34	10.35	3.97–26.99			

Note. OR = odds ratio, p = Wald p -value, 95% CI = 95% confidence interval, IPV = Intimate Partner Violence Victimization before or after Hurricane Katrina.