Physically and Sexually Violent Experiences of Reproductive-Aged Women Displaced by Hurricane Katrina

Carla W. Picardo, MD, MPH; Shirley Burton, MPH; John Naponick, MD, MPH; and the Katrina Reproductive Assessment Team

Purpose: Measure the frequency of physical and sexual abuse in a sample of reproductive aged women displaced by Hurricane Katrina, and compare those experiences to the year before Hurricane Katrina.

Methods: Sixty-six English-speaking women aged 18-49 years residing in Louisiana Federal Emergency Management Agency (FEMA) housing were screened for physical and sexual abuse seven to nine months after Hurricane Katrina, using modified 3x7 cluster sampling methodology.

Findings: Twenty-three percent (95% confidence interval [CI], 14, 34%) of women reported being hit or verbally threatened since Hurricane Katrina. Abuse had increased for 33% (95% CI, 13, 63%) and decreased for 13% (95% CI, 4, 37%) of women. Twenty percent (95% CI, 6, 51%) of abused women were with a new partner, while 13% (95% CI, 4, 39%) reported new abuse with the same partner. Four women reported sexual abuse since Hurricane Katrina. Compared to before the storm, the frequency of sexual abuse was the same for two women, and one reported new abuse with the same partner.

Conclusions: Physical abuse was not uncommon among displaced women following Hurricane Katrina. Increasing and new abuse were the most commonly reported experiences. Violence against women should not be overlooked as a continued, and perhaps escalating, occurrence requiring attention following displacement after disasters of such magnitude as Hurricane Katrina.

INTRODUCTION

Limited, conflicting data exist about the effects of natural disasters on the frequency of physical and sexual abuse against women. Spousal abuse calls to the community hotline in Miami increased about 50% after Hurricane Andrew in 1992. The number of police reported cases of domestic violence increased 45.6% during the six months following Mount St. Helen’s eruption in 1980. A study of 205 women living with their male partners reported various types of intimate partner violence (IPV) nine months after the 1993 Missouri flood. Fourteen percent reported at least one act of physical aggression from their partners, 26% emotional abuse, 70% verbal abuse, and 86% partner anger (Mechanic M, Griffin M, Resick P. The effects of intimate partner abuse on women’s psychological adjustment to a major disaster. Unpublished data, 2001). There were no pre-flood rates with which to compare these figures. Conversely, a comparison of pre- and post-disaster self-reported intimate partner violence among a sample of female textile mill workers affected by Hurricane Floyd in eastern North Carolina in 1999 showed no increase in domestic violence rates. A 2005 report by the World Health Organization stated that “research is needed on domestic and sexual violence in the aftermath of a disaster.”

There is more research published about the risks of intimate partner violence in general. Few of these risks have been found to be consistent across the literature. Two risk factors found to be almost universal are poverty/low socioeconomic status and alcohol abuse by the abuser. The relationship of alcohol use and intimate partner violence was found to have correlation coefficients from 0.21 to 0.57 in one meta-analysis and a moderate effect size in another meta-analysis. A study of Canadian women showed women with partners who were frequently drunk had six times the risk of experiencing violence. One might hypothesize this effect would be diminished in the setting of disasters, given access to alcohol would likely be more limited.

The prevalence of IPV increases in the setting of low socioeconomic status. This phenomenon is true not only
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in the United States, but also in other countries such as Thailand, China, and Nicaragua.\textsuperscript{9, 10, 11} Because Hurricane Katrina disproportionately displaced those individuals and families in lower income neighborhoods, one might hypothesize the prevalence of IPV would be high or increased under the extra economic burden, both among those advantaged and disadvantaged before the storm.

Displacement creates altered living conditions, including living close to neighbors and potentially in a crowded home situation. The literature does not support an effect of living quarters on an increased risk of IPV. A study of women in St. Petersburg, Russia, showed a decreased risk of IPV in couples living in communal apartments.\textsuperscript{12} A study in India showed no difference in risk between private living situations and more communal ones;\textsuperscript{13} a study in South Africa showed no effect of crowded living situations.\textsuperscript{5} Because of the unique living quarters, FEMA trailers, to which Katrina survivors were displaced, it may be hypothesized the quarters themselves would not change the prevalence of IPV.

There has been a recent move in IPV research to investigate the community and societal factors that may contribute to an increased risk in IPV over the individual factors. “IPV is entirely a product of its social context.”\textsuperscript{14} The type of neighborhood and the way IPV is looked upon may affect an individual’s risk. One study found societies with the lowest levels of IPV were those with community sanctions against IPV (legal and/or moral pressure from neighbors to intervene) and those where the abused had access to safe havens (shelters and/or family support).\textsuperscript{3} A prime example of the importance of context is from Fox and Benson\textsuperscript{14} who found the rates of IPV of economically advantaged couples was significantly higher among those who lived in disadvantaged neighborhoods compared to those living in advantaged neighborhoods. Other studies have found neighborhood characteristics (per capita income, unemployment rates) to confound the relationship of race and IPV.\textsuperscript{15} After Hurricane Katrina, the management of FEMA parks with regard to security, how communal relationships were formed, and other similar factors might affect whether or not the prevalence of IPV was increased or decreased. How competitive neighbors felt over resources may also have played a role.

Over 2.5 million individuals were displaced due to Hurricane Katrina, which reached the Gulf Coast on August 29, 2005, and Hurricane Rita, which closely followed.\textsuperscript{16} As of August 2006, over 650,000 households had been placed in apartments, manufactured homes, or other temporary housing through FEMA.\textsuperscript{17}

The purpose of this descriptive study was to sample women of reproductive age displaced by Hurricane Katrina and to learn about their experiences with physical and sexual violence the year leading up to Hurricane Katrina and seven to nine months after displacement. We hypothesized that factors surrounding the disaster and displacement, such as the increase in individual and familial stress, lack of financial and supportive resources, and variable security in the FEMA housing parks, increased physical and sexual violence against women as compared to the experiences of these same women before the storm.

METHODS

A sample of English-speaking women aged 18-49 years residing in FEMA-issued temporary housing in Louisiana were interviewed seven to nine months after Hurricane Katrina. Interviews were conducted in four of nine regions in Louisiana defined by the Office of Public Health, including the central and southern parishes. A current roster of all FEMA-supported temporary housing sites in the state was obtained, and sites that were not occupied were excluded from the study. Sites located on private residential property were excluded, as these were typically one-family units located on homeowners’ own property.

A modified 30x7 cluster sampling approach (seven random households interviewed in 30 random clusters) was used;\textsuperscript{18} 40 clusters were planned in order to compensate for small FEMA sites which housed fewer than seven units. A list of 40 sites was randomly generated with SPSS10.0 (SPSS, Inc., Chicago, IL), using probability proportionate to size. The selected sites were further randomized into strata of interview times (weekdays before 5 p.m., weekday evenings after 5 p.m., and weekends). This study was not advertised.

Once at a selected site, the interviewer(s) created a map, if one was not already available from the site, and systematically numbered each FEMA unit to serve as a generic “address.” Using a list of randomly generated numbers (http://www.randomizer.org) unique to each sampling site, interviewers approached units in the order of those numbers, matching them to the generic addresses. If the interviewers found any women of reproductive age (18-49 years) willing to participate in the interview, the consent was read, and the interviewer proceeded with a 20-question survey in privacy that was acceptable to the interviewee. The first 16 questions related to demographics and reproductive health issues. If the participating woman was the only adult at home during the interview, she was asked four additional questions about physical and sexual abuse before and after Hurricane Katrina. Physical abuse was described as being “hit” or “threatened verbally” and sexual abuse as “forced to have sex.” Although some sites resulted in no interviews, some resulted in eight interviews, as all eligible women were asked to participate. Those women reporting abuse were then asked to compare the frequency of abuse to the abuse, if any, during the year leading up to Hurricane Katrina. To be eligible to participate in the interview, each woman had to 1) be English-speaking in order to understand all survey questions, 2) be between the ages of 18 and 49 years on the day of the interview, 3) be an occupant of the FEMA trailer visited, and 4) had evacuated due to Hurricane Katrina.

All interviews were conducted in the same structured manner by trained female interviewers, and each interviewee was given verbal as well as written information about
available health resources within her community, including recovery centers, a mental health crisis line, and statewide domestic violence hotlines. Each site was visited once during the randomly assigned interview time period. Pertinent, non-identifiable information was kept for each site and unit to document participation, and all recorded results were kept confidential. The study design, consent process, survey questions, and all other aspects of the study were approved by the Institutional Review Boards (IRBs) at both the University of North Carolina at Chapel Hill (Chapel Hill, North Carolina) and Louisiana Department of Health and Hospitals (Baton Rouge, Louisiana).

Data were analyzed using STATA SE 9.0 (STATA Corp., College Station, Texas). Data were not weighted, given the sampling design. We used STATA survey commands to factor in intra-cluster correlation that could have occurred among women interviewed at the same time of day and women interviewed within the same FEMA park. Statistical significance was defined a priori as a p-value < 0.05. Frequencies and 95% confidence intervals (95% CIs) were reported for categorical data. Means and standard errors were calculated for continuous variables, and medians and ranges were calculated for ordinal variables. We used the following statistical tests to calculate p-values: adjusted Wald test for age, test of medians for parity, and Chi-square test for the remaining categorical variables.

RESULTS

A total of 115 eligible FEMA trailer park sites were located in Louisiana’s Office of Public Health regions 1, 2, 3, and 6, accounting for 5132 individual housing units (Figure 1). The 40 sites randomly selected were estimated to have 1614 units. Attempts were made to sample all sites selected. One site no longer housed FEMA units. One site was a cruise ship docked in Chalmette, Louisiana, which had been emptied by the time an attempt was made to interview residents. Interviewers were refused entry into two sites, both in region 1. FEMA personnel refused our entry into one site, while the second site housed federal employees and the head of security refused our entry.

Of the 36 FEMA sites sampled, a record of the number of units visited, women of reproductive age encountered, and participants was kept for all but two sites. A compromise was made at one of these sites, which would not allow interviewers to randomly knock on trailer doors. Rather than following our protocol, we were directed to the trailers of women known by the management to be of reproductive age. Because the management had such an active involvement with the residents at the park, we felt all eligible women were approached. Fewer than seven women were home at that site. At the second site, records of the number of units approached and number of women who declined was not kept adequately. Because of their unique situations, these sites are not included in the unit sampling summary (Figure 2). These two sites accounted for 10 of the interviews that included IPV screening.

Over 774 units were visited to locate 121 eligible women. Ineligibility was mainly due to language (Figure 2). Seventy-five percent of women from the 34 sites with complete participation data agreed to participate in the survey. Of the 103 women interviewed, 66 were the only adults at home, meeting the IRB criteria for screening for physical and sexual abuse. Contributory data, including physical and sexual abuse screening answers, were missing for two women who were the only adults home.

None of the characteristics of the 66 women who completed the physical and sexual abuse assessment differed significantly between the regions or interview timing. The women were aged 19 to 49 years, with a mean age of 34.1 (SE 0.78) (Table 1). The overall age distribution of the women queried was similar to the distribution of women of reproductive age in Louisiana in 2004, except the study sample was slightly older; women aged 18 and 19 years were underrepresented. The median parity of the women sampled was two (range 0-8) live births. Approximately one-third of women (32%; 95% CI=22, 44%) interviewed

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Figure 1. Summary of the Federal Emergency Management Agency (FEMA) site sampling.
identified themselves as the head of the household, or not living with a spouse or partner. Seventy-one percent of the women interviewed reported evacuating before Hurricane Katrina made landfall. Almost half (45%; 95% CI=34, 57%) evacuated within 36 hours before the storm. Twenty-four percent (95% CI=15, 37%) did not evacuate until after the storm. Compared with the women who were not screened for abuse were more likely, though not significantly, to be interviewed during the weekend hours than women not screened (41% versus 14%, p=0.09).

Fifteen women (23%; 95% CI=14, 34%) reported being hit or verbally threatened by a spouse, partner, or other person since Hurricane Katrina (Table 2). Of the women questioned about being hit or verbally threatened, only one woman declined to answer. When asked how the frequency of abuse after Hurricane Katrina compared with abuse, if any, during the year leading up to the storm, one-third (95% CI=13, 63%) of women who screened positive for abuse reported an increase in abusive activity with the same partner, 13% (95% CI=4, 37%) a decrease with the same partner, and 20% (95% CI=6, 49%) no change in abuse with the same partner. Twenty percent (95% CI=6, 49%) of these women were experiencing abuse with a new partner; 13% (95% CI=4, 39%) were with the same partner, but abuse was new since the storm. No significant differences emerged in abuse frequency among women by region or interview timing. Women who reported physical abuse did not differ significantly from women who reported no physical abuse with respect to age, parity, head of household status, or evacuation timing.

Figure 2. Summary of the Federal Emergency Management Agency (FEMA) unit sampling. Eligibility criteria for violence against women screening included ages 18-49 years, English-speaking, and being the only adult home in the trailer unit at the time of interview.

* Two sites (N=36 sites) were not included in the above summary. Documentation of the number of women declining participation was not adequately kept at one of the sites. Management at the last site would not permit interviewers to engage in random sampling. We were allowed to set up a site at a health fair and when no women participated, we were directed towards all known trailers in the park where women ages 18-49 resided.

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Fewer women reported being forced to have sex by a partner or other person since Hurricane Katrina. Four of the 65 women (6%; 95% CI=3, 13%) who answered reported sexual abuse (Table 2). This abuse was the same as it had been in the year leading up to Hurricane Katrina for two of these women; one woman reported new abuse with the same partner. One woman did not answer. Again, no significant differences were evident in abuse frequency among women by region or interview timing. Women who reported sexual abuse did not differ significantly from women who reported no sexual abuse with respect to age, parity, head of household status, or evacuation timing.

CONCLUSIONS AND DISCUSSION

Almost 25% of the women screened in this study reported being hit or verbally threatened since Hurricane Katrina. Most of these cases of abuse were with new partners or an increase in or new violence with the same partner they had leading up to Hurricane Katrina. Despite organized and visible security at some of these FEMA sites, answers affirmed violence against women was not uncommon.

Another survey study assessed abuse after Hurricane Katrina, and researchers found different results. The International Medical Corps surveyed a representative from each of 366 households displaced by Hurricane Katrina...
to FEMA trailers in Louisiana and Mississippi during April and May 2006, a similar time period as our study. They interviewed individuals of either gender aged 18-87 years. They found 27% had experienced violence by a spouse in their lifetime and 3% had experienced intimate partner violence since displacement. By querying only a representative for each household, the abuser may have been the individual interviewed or may have been nearby, and results may underestimate the true frequency. Although we restricted our sample to women who were the only adults in the trailer during the interviews, we may have created a situation that felt safe for women to discuss their experiences frankly.

Our study had both strengths and weaknesses. The study included a representative sample of women in all eligible age groups, which reflected a similar breakdown as the 2004 Louisiana population estimations. Seventy-five percent of women approached in the 34 sites for which we had participation data participated, and there was minimal missing questionnaire data. Sampling occurred at different times of the day and week in order to avoid a bias towards women who were not employed or had no transportation elsewhere. Interviewers were women and privacy was respected, perhaps creating an atmosphere encouraging women to willingly share their experiences, even about sensitive topics.

On the other hand, due to the nature of some of the questions included in the survey, the University of North Carolina’s Investigational Review Board prohibited including individuals younger than 18 years. They had 27% had experienced violence by a spouse in their lifetime and 3% had experienced intimate partner violence since displacement. By querying only a representative for each household, the abuser may have been the individual interviewed or may have been nearby, and results may underestimate the true frequency. Although we restricted our sample to women who were the only adults in the trailer during the interviews, we may have created a situation that felt safe for women to discuss their experiences frankly.

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On the other hand, due to the nature of some of the questions included in the survey, the University of North Carolina’s Investigational Review Board prohibited including individuals younger than 18 years. Because our survey also included questions about contraception, pregnancy, and other reproductive health issues, we did not involve women older than 49 years of age. Questions about violence against women did not address the timing of abuse, which would be useful information. The choice of sample pool, women currently in FEMA housing located off private property, created a dependency on accurate data of locations of FEMA housing units and trailer parks as well as the number of occupied units. This information was not always accurate. Limited information about various FEMA parks was one reason for a lower sample size than intended. We had assumed that all sites were similar and individuals ended up at one park or another randomly. In reality, some parks, especially in region 2, disproportionately housed elderly residents, while others were for employees for the same workplace and on employer property. FEMA security, where present, was inconsistent and there were some sites into which interviewers were refused entry. One site initially would not allow us entry unless we agreed to submit the names and other information about the individuals to whom we spoke. We did not agree to such terms, but were ultimately granted access; on the other hand, some sites gave us maps of the trailer park to support and expedite our efforts.

Due to the size of the study and potential sources of bias, generalizability of our results is limited. Women were fluent in English, living in FEMA housing not on their own property, and were not displaced outside of Louisiana. Women who were the head of their households were statistically less likely to be screened. These women were not living with a spouse or recognized domestic partner. Under-representation of these women may have led to an overestimate of the frequency of physical and sexual abuse specifically by intimate partners, as we might assume these unscreened women were less frequently in the presence of an abuser or potential-abuser. On the other hand, by only screening women who were the only adult at home during the interview, we could have underestimated the frequency of abuse, as women in abusive relationships may not have been left alone long enough to create an opportunity to participate in a study interview. They may have also been

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Screened (N=66)</th>
<th>Not Screened (N=35)</th>
<th>P-valueb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>34.14 (0.78)</td>
<td>34.91 (1.21)</td>
<td>0.62</td>
</tr>
<tr>
<td>Median parity (range)</td>
<td>2.0 (0-8)</td>
<td>2.0 (0-6)</td>
<td>0.02</td>
</tr>
<tr>
<td>% Head of household</td>
<td>32% (23%-44%)</td>
<td>74% (61%-84%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>When evacuated for Hurricane Katrina</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&gt;3 days before</td>
<td>8% (3%-17%)</td>
<td>11% (5%-23%)</td>
<td>0.85</td>
</tr>
<tr>
<td>36-72 hours before</td>
<td>18% (12%-27%)</td>
<td>20% (6%-48%)</td>
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<tr>
<td>&lt;36 hours before</td>
<td>45% (34%-57%)</td>
<td>43% (28%-59%)</td>
<td></td>
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<tr>
<td>During the storm</td>
<td>5% (2%-11%)</td>
<td>6% (1%-25%)</td>
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<tr>
<td>After the storm</td>
<td>24% (15%-37%)</td>
<td>20% (11%-34%)</td>
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aPercentages (95% confidence intervals) with the exception of age (mean and standard error) and parity (median and range)
bP-value determined using a Chi-square test with the exception of age, where an adjusted Wald test of equality of the means was used, and parity, where a test of medians was used.
more inclined to refuse participation or not answer the door, giving us the impression that no one was home.

Although we had anticipated the potential to encounter difficulties in screening women individually for IPV due to the sensitive nature of the topic, we underestimated the role of the variability of the FEMA parks. Some parks were established by employers for their employees and families, which would likely offer a more communal atmosphere with families and friends who were more financially secure. Some parks had only a few occupied trailers and were located in rural areas with no on-site security or bus service. Other parks had hundreds of trailers, strict on-site security and bus service into nearby urban centers, which would also include access to alcohol. Some women lamented the lack of intervention by security personnel when conflict within the park arose, so the role of security is difficult to determine without further study. Data about the characteristics of each FEMA park were not collected, so comparisons between parks could not be made. Future studies should consider collecting site-specific information that might reflect the acceptability of IPV, access to items such as alcohol, security, crime, and other communal aspects. Such information may be useful in the future organization of FEMA parks after disasters in such a way that conflicts are minimized and individual safety maximized.

The issue of violence against women after disasters is both socially and clinically relevant. Women who are abused are more likely to have depression, anxiety, somatization, attempt suicide, abuse drugs or alcohol, and frequently visit the emergency room. At least one study showed a history of violent events for a woman was significantly associated with gynecologic problems, such as sexually transmitted infections and severe menstrual problems.

The effects of physical and sexual abuse of reproductive-aged women reach beyond the women themselves. Studies have shown that children witnessing domestic abuse, whether or not they themselves are abused as well, have measurable negative behavioral, emotional, and cognitive effects. Such effects translate into long-term effects on families and communities.

The results of this study support the need for further evaluation of and sensitivity to the issue of potentially escalating violence against women after natural disasters. They also support the need for services to be available following disasters. Information about safe havens for women who are abused should be available as food, clothing, and other necessities are distributed after disasters. Relief workers should be aware that abuse exists and where to refer women who require additional support. Although during the aftermath of disasters organizing such efforts may prove most challenging, any services available may prove crucial to women experiencing physical and sexual abuse. Future studies may also be designed to tease out the effects of various FEMA park characteristics which might increase or decrease IPV with the goal of organizing parks in the future which would reduce conflicts and create a sense of community.

ACKNOWLEDGEMENTS

The Hurricane Katrina Reproductive Assessment Team members: Laverne Aguillard, RN, MEd, Louisiana Office
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We wish to thank the Carolina Center for Public Service for the Gulf Coast Relief Grant, which partially funded this endeavor.

REFERENCES


Dr. Picardo is an assistant research professor in the Department of Social Medicine at the University of North Carolina School of Medicine and an instructor in obstetrics and gynecology with the St. Vincent Health System’s Family Medicine Residency Program. During the study, she was a resident in general preventive medicine at the University of North Carolina School of Medicine and a fellow in the Training in Epidemiology and Clinical Trials in Obstetrics and Gynecology Fellowship Program through the Center for Women’s Health Research at the University of North Carolina, Chapel Hill. Ms. Burton is an epidemiologist for the Louisiana Office of Public Health, Region 6.

Dr. Naponick currently serves as the team leader of The Reduction in Maternal Mortality Project, Ministry of Health of the Kingdom of Cambodia in Phnom Penh, Cambodia. During the study, he was the medical director of the Louisiana Office of Public Health, Region 6 in Alexandria, Louisiana. The Katrina Reproductive Assessment Team members are affiliated with the following institutions: Office of Public Health Region 2, in Baton Rouge, Louisiana; Office of Public Health, Region 3 in Thibodaux, Louisiana; Tulane School of Public Health, New Orleans, Louisiana. Dr. Picardo was supported by an Epidemiology and Clinical Trials Training Fellowship grant from the National Institute of Child Health and Human Development and a project grant from the Carolina Center for Public Service.