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Abstract

In the present study, the authors examined the role of child-related stressors in the psychological adjustment of lower-income, primarily unmarried and African American, mothers ($N = 386$). All participants lived in areas affected by Hurricane Katrina, and about a third were also exposed to Hurricane Rita (30.3%, $n = 117$). Lacking knowledge of a child's safety during the hurricanes was a significant predictor of heightened postdisaster psychological distress and posttraumatic stress, even after controlling for demographic variables, pre-disaster psychological distress, evacuation timing, and bereavement. From interviews with a subset of the participants ($n = 57$), we found that mothers consistently put their own needs behind those of their children. The authors recommend policies that promptly reunite mothers with missing children and support lower-income mothers in caring for their children during natural disasters and the aftermath.

Keywords

Hurricane Katrina, Hurricane Rita, disasters, lower-income mothers, mothering, child-related stressors

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I had to be the strong person, because they needed me. It was like I would go through the whole day, and I would be okay because I had to be. And then at night, when the house was settled, the kids were asleep, that's when it really hit me.

—Hurricane Katrina Survivor and mother of 4- and 6-year-old children

Mothers of young children tend to the safety and well-being of their children, a responsibility that was heightened in the aftermath of Hurricane Katrina. Their struggles to protect their children are likely to have increased their vulnerability to a range of postdisaster mental health problems. In the present study, we explore the relationship between child-related stressors and psychological functioning among 386 lower-income mothers who survived Hurricane Katrina, approximately a third of who were also exposed to Hurricane Rita (30.3%, $n = 117$).

Background

Growing evidence suggests that Hurricane Katrina had both immediate and lasting adverse mental health consequences (e.g., Galea et al., 2007; Rhodes et al., 2010; Weisler, Barbee, & Townsend, 2006). Families living in Federal Emergency Management Agency (FEMA)–subsidized hotels or trailers suffered from high rates of disability among caregivers of children, due to depression, anxiety, and other psychiatric problems (Abramson & Garfield, 2006). Other researchers have found that young adults, women, single mothers, and those with lower income are at increased risk of psychological symptoms after natural disasters (e.g., Bolin & Bolton, 1986; Kessler et al., 2008).

Lower-income communities were especially vulnerable to impact of Hurricane Katrina (Logan, 2006). Lower-income families were disproportionately stranded in the city or in shelters after the storm, increasing the likelihood that they experienced deprivation, stress, and fear (e.g., Lavelle & Feagin, 2006; Spence, Lachlan, & Griffin, 2007). Others have noted that those with fewer economic resources are more likely to live in housing that is unable to withstand natural disasters (e.g., Ruscher, 2006). Moreover, poorer people tend to receive and heed fewer evacuation warnings (e.g., deciding to stay behind to care for members of their community), heightening their risk for exposure (e.g., Stephens, Hamedani, Markus, Bergsieker, & Eloul, 2009).

Lower-income African American mothers in the United States, particularly those receiving welfare, face many negative stereotypes (e.g., Handler & Hasenfeld, 2007; Seccombe, James, & Walters, 1998), despite the tenacity and strength that many demonstrate as they fill multiple roles within their families and communities (e.g., Hamilton-Mason, Hall, & Everett, 2009). They face

ongoing struggles with substandard child care, poor educational options, economic hardship, and racial oppression (Edin & Kefalas, 2007). In the New Orleans area prior to Hurricane Katrina, the intersection of race, class, and gender disparities rendered lower-income, African American mothers at an increased vulnerability to poverty, unemployment, low educational attainment, and lack of individual and family health insurance (Jones-DeWeever & Hartman, 2006). We expected that hurricane-related stressors (e.g., lack of food, necessary medicines, and medical care) would further compound mothers' parenting and caregiving stress. In the aftermath of disasters, young mothers typically bear the responsibility of caring for their elders and small children, rendering them less able to attend to their own psychological needs (e.g., Morrow, 1997).

Hurricane Katrina led to mother-child separations (Osofsky, Osofsky, & Harris, 2007), indicating the requirement for disaster policies to better prioritize the needs of children and families (Shriver et al., 2009). Although more than 5,000 children were eventually reunited with their families (Broughton, Allen, Hanneman, & Petrikin, 2006), it is likely that their parents still suffered psychological distress due to such separations. Even when mothers were with their children, they faced other child-related stressors, including basic survival concerns and difficulties providing food or diapers, securing medical care, and comforting children suffering from emotional distress (Madrid & Grant, 2008), again suggesting that improvements in disaster preparedness policies are necessary.

Threats to children's well-being are likely to be particularly salient to mothers. Stress theorists (e.g., Hobfoll, 1989; Lazarus & Folkman, 1984) suggest that situational factors influence the psychological experience of stressors and, specifically, the threats of "off time" life events, including deaths of young children, typically result in extreme distress. Researchers have provided evidence that child-related stressors, including child bereavement (Murphy, Johnson, & Lohan, 2002), pediatric cancer (Manne, Duhamel, & Redd, 2000), and general worries about children's well-being (Greenberger & O'Neil, 1990) are strongly associated with parental psychopathology. Moreover, risk factors are often cumulative, carrying additive and exponential vulnerability to negative mental health outcomes (Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998). Therefore, in the context of natural disasters, additional stressors of child-related concerns are likely to have increased mothers' risk of psychological distress.

Few researchers, however, have examined the range of child-related stressors and their psychological toll on young mothers during and after natural disasters. In this study, we sought to better understand the difficult circumstances

and mental health effects in a vulnerable group: young, lower-income, mostly unmarried, African American mothers who survived Hurricane Katrina. We expected that mothers who suffered child- and family-related stressors during or in the immediate aftermath of the storm would have elevated levels of posttraumatic stress and psychological distress. To explore the broader range of child-related concerns during the hurricane and the following year, and their impact on maternal mental health, we conducted qualitative analysis of individual, face-to-face interviews with a subset of participants.

Method

Procedure and Participants

Institutional review boards from Manpower Demonstration Research Corporation and the principal investigators' universities (Harvard University, Princeton University, and University of Massachusetts Boston) approved the study. Participants were initially part of a study of lower-income parents who had enrolled in three community colleges in the city of New Orleans in 2004-2005. The purpose of the initial study was to examine whether performance-based scholarships affected the academic achievement, health, and well-being of lower-income parents (Richburg-Hayes et al., 2009). The researchers selected lower-income parents given that their competing demands at work, school, and parenting often impede their educational attainment. Eligible participants had to be between the ages of 18 and 34 years, be parents of at least one dependent child less than 19 years of age, have a household income less than 200% of the federal poverty level (Handler & Hasenfeld, 2007), and have a high school diploma or equivalent. At baseline (i.e., on enrollment in the study and prior to random assignment), participants provided primarily demographic information (e.g., age, race, number of children).

By the time Hurricanes Katrina and Rita made landfall, on August 29, 2005, and September 24, 2005, respectively, 492 participants had completed a 12-month follow-up telephone survey (Time 1; predisaster). After Hurricanes Katrina and Rita, between May 2006 and March 2007, 402 of 492 participants (81.7%) were successfully located and surveyed (Time 2; postdisaster). The high retention rate is a notable given the challenges of retaining participants in longitudinal, community-based research, especially when participants have been exposed to traumatic stress or displaced, and the selection bias that attrition introduces to research studies (e.g., Scott, Sonis, Creamer, & Dennis, 2006; Sullivan, Rumptz, Campbell, Eby, & Davidson, 1996).

The small subsample of male participants ($n = 16$) was dropped from the present study, leaving a mother-only study. The current quantitative analyses therefore drew on a sample of 386 mothers. On average, the mothers were 25.42 years old ($SD = 4.43$) and had 1.95 children ($SD = 1.06$). The majority of the mothers were identified as African American (82.1%, $n = 317$), and 9.8% ($n = 38$) identified as White, 2.9% ($n = 11$) as Hispanic, and 1.6% ($n = 6$) as other race or ethnicity. All participants reported living in areas affected by Hurricane Katrina (100.0%, $n = 386$), and about a third (30.3%, $n = 117$) reported living in areas affected by Hurricane Rita.¹

We also included data from individual, face-to-face, qualitative interviews with 57 of the participants at the postdisaster time point (Time 2). The qualitative interviews took place between May and September 2006, approximately 8 months to a year after Hurricane Katrina. Interviews were conducted in a mutually convenient location (e.g., the interviewee's home, the interviewer's office, a coffee shop), typically lasted between one and two hours, were audio-taped, transcribed, and verified. Interviewers asked participants about their experiences during the hurricane and the following year how the hurricane had affected their family relationships and how they came to postdisaster decisions about employment, education, and housing. The qualitative interviews therefore covered a range of topics and were not specifically designed to study child-related stressors; however, interviewees repeatedly commented on child-related concerns.

Participants for the Time 2 qualitative interviews were selected because they formerly lived in either Orleans or Jefferson Parishes prior to the hurricane and suffered damage to their pre-Katrina home. Differences between these two parishes are notable. For example, more than 75% of the population of Orleans Parish was affected by flooding, compared with approximately 40% in Jefferson Parish (Gabe, Falk, McCarthy, & Mason, 2005). In addition, interviewees were selected to represent comparable numbers of participants who returned to New Orleans or relocated elsewhere (e.g., to Baton Rouge, Houston, or Dallas). On average, the interviewees were 23.26 years old ($SD = 3.07$) and had 1.81 children ($SD = 1.08$). The majority were identified as African American (86.0%, $n = 49$), and 1.8% ($n = 1$) identified as White, 7.0% ($n = 4$) as Hispanic, and 1.8% ($n = 1$) as other race or ethnicity.

Measures

Demographic variables. We included participants' age at baseline and number of children at Time 1 as covariates as well as dummy codes for African American and Hispanic.

Hurricane-related stressors. We included dummy-coded variables indicating stressors experienced during the hurricanes and their aftermath. First, we included major stressors that previous researchers (e.g., Brewin, Andrews, & Valentine, 2000) have found to increase survivors' risk of postdisaster psychopathology, whether they evacuated prior to Hurricane Katrina (full sample: 95.6%, $n = 369$; qualitative subsample: 96.5%, $n = 55$), and whether they had lost a family member or close friend due to the hurricanes and their aftermath ("bereavement"; full sample: 28.5%, $n = 110$; qualitative subsample: 29.8%, $n = 17$). We also included a variety of child- and family-related stressors: whether they lacked awareness of their children's safety (full sample: 24.1%, $n = 93$; qualitative subsample: 22.8%, $n = 13$), whether they lacked awareness of other family members' safety (full sample: 70.8%, $n = 301$; qualitative subsample: 86.0%, $n = 49$), whether members of their family lacked necessary medicines or medical care (full sample: 34.5%, $n = 133$; qualitative subsample: 33.3%, $n = 19$), and whether they were ever separated from their children (full sample: 15.8%, $n = 61$; qualitative subsample: 17.5%, $n = 10$). These items were selected from a larger scale on hurricane exposure, designed by the *Washington Post*, the Kaiser Family Foundation, and the Harvard School of Public Health (Brodie, Weltzien, Altman, Blendon, & Benson, 2006).

General psychological distress. The K6 scale, a six-item screening measure of nonspecific psychological distress with good psychometric properties (Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002), assessed pre- and postdisaster psychological distress. Participants rated items (e.g., "During the past 30 days, about how often did you feel so depressed that nothing could cheer you up?") on a 5-point Likert-type scale ranging from 0 (*none of the time*) to 4 (*all the time*). Time 1 mean K6 scores were 5.61 ($SD = 3.92$) for the full sample and 5.54 ($SD = 4.07$) for the qualitative subsample. Time 2 mean K6 scores were 6.71 ($SD = 5.24$) for the full sample and 6.68 ($SD = 5.21$) for the qualitative subsample. Reliability of the K6 scale in this study was Cronbach's α of .70 (Time 1) and .80 (Time 2).

Posttraumatic stress. Posttraumatic stress was measured using the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997), a 22-item scale assessing intrusion, avoidance, and hyperarousal symptoms. Participants rated whether they experienced symptoms (e.g., "any reminder brought back feelings about it") in the previous week on a scale ranging from 0 (*not at all*) to 5 (*extremely*). Researchers found that this scale has high internal consistency and is highly correlated with the much lengthier posttraumatic stress disorder (PTSD) checklist (Creamer, Bell, & Failla, 2003). Participants' average IES-R scores were 33.82 ($SD = 22.56$) for the full sample and 33.42 ($SD = 23.62$) for the qualitative subsample. For the current study, the reliability of the IES-R was Cronbach's α of .95.

Qualitative coding. The 57 interviews were coded line by line in Atlas.ti qualitative software. First, an advanced sociology doctoral student coder used descriptive codes based on prior research on disasters and the investigators' interests. Descriptive codes covered a broad range of general topics, such as "children," "health," and "education." After the line-by-line descriptive coding was complete, the research team critically examined quotations that fell under the general code "children." A professor of psychology and advanced psychology doctoral student coded the quotations to address two questions: (a) Which child-related stressors were most salient to mothers? and (b) How might these stressors have affected mothers' mental health? They met weekly to discuss themes evident in the data as well as readings on natural disasters, family functioning, and lower-income mothers. After substantial immersion in the data, two preliminary categories were created: child-related stressors and mothering. The child-related stressors category was divided into thematic codes for stressors related to basic needs, health, and socioemotional well-being. A case matrix with codes was then constructed, which allowed for a closer examination of mothers' child-related stressors (Miles & Huberman, 1994). We entered quotations for each participant into the matrix and subsequently coded for each category for each participant. The two researchers first coded independently, verified each other's work, and resolved coding discrepancies or differences to ensure trustworthiness of the data, enhance the rigor of the analysis, and increase dependability of the findings (Anfara, Brown, & Mangione, 2002). When differences in coding arose, the research team discussed the quotation until each team member agreed on the coding. In addition, we discussed our biases and how they might affect our analysis and in doing so increased the credibility and confirmability of the results (Morrow, 2005). We also reduced bias through counting procedures; that is, we tallied that number of participants included under each code to provide a sense of the frequency with which each code was applied (Miles & Huberman, 1994). This prevented us from putting undue weight on participants whose accounts were particularly vivid, moving, or engaging, or that fit our preexisting beliefs and biases. In coding the data, we moved between coded quotations and raw data to establish a better sense of the contexts in which interviewees were living.

Results

Quantitative Analysis

Missing data and descriptive analysis. All variables had less than 5% missing values, except for the variable asking about separations from children (26.7% missing). Multiple imputation was conducted to handle missing values using

Amelia II in R software. Subsequent analyses were conducted independently across five complete datasets. Results represent an average of the five separate analyses with Rubin's (1987) correction of standard error. All colinearity tolerance statistics were above 0.86, indicating an absence of multicollinearity (Tabachnick & Fidel, 2007). We also conducted chi-squared and independent samples *t*-tests to investigate differences between the respondents who participated only in the quantitative survey ($n = 386 - 57 = 329$) and those who participated in both the qualitative and quantitative portions of the study on all the variables included in the study. We found that participants in the qualitative sample were significantly younger, $t(386) = -5.31, p < .001$, had significantly younger last-born children, $t(386) = -3.76, p < .001$, and were less likely to identify as White, $\chi^2(1) = 5.63, p < .05$.

Regression analyses. To test the impact of family- and child-related stressors during and after the hurricanes on participants' mental health, we conducted two stepwise regression models, one predicting postdisaster PTSD and the other predicting postdisaster psychological distress (Table 1). Baseline predictors, including age, number of children, African American, Hispanic, and pre-Katrina psychological distress, were entered at Step 1. Major hurricane stressors (timing of evacuation; bereavement) were entered at Step 2, and child- and family-related stressors were entered at Step 3. Results indicated that controlling for baseline predictors and major hurricane stressors, lacking knowledge of a child's safety was associated with higher levels of both PTSD symptomatology and psychological distress ($p < .05$).

Qualitative Analysis

We sought to identify a broader range of child-related stressors, and how such concerns might have affected maternal mental health, through qualitative analysis of the 57 interviews. We found that the child-related stressors most salient to mothers pertained to their children's basic needs (e.g., food, shelter, and clothing), health, and socioemotional well-being. We discuss each of these domains below and then describe how the demands of mothering in the aftermath of the storm might have led to increased psychological distress.

Basic needs. Once the mothers escaped direct exposure to the hurricanes, they often lacked suitable housing, food, clothing, and other necessities ($n = 11$), a concern noted in the disaster preparedness literature (Madrid & Grant, 2008). Disruption of basic needs exacerbated the mothers' risk for emotional distress (e.g., Weems et al., 2010). One woman, a 22-year-old, African American, mother of three, described the emotional pain she experienced when seeing her newborn daughter without the basic needs of diapers, clothing, and food:

Table 1. Stepwise Regression (Step 3) Predicting PTSD and Psychological Distress

	PTSD			Psychological Distress				
	R ²	R ² Δ	B	SE	R ²	R ² Δ	B	SE
Step 1: Baseline predictors	0.14				0.15			
Age			0.73	0.25			0.08	0.06
Number of children			-0.85	1.09			-0.52	0.25
African American			10.35***				0.54	0.69
Hispanic			10.94				0.65	1.49
Pre-Katrina psychological distress			1.25***				0.44***	0.06
Step 2: Major stressors	0.19	0.05***			0.18	0.03***		
Evacuated before Katrina			-4.24	3.02			0.95	0.70
Death of family member or friend			9.93***	2.55			1.49*	0.58
Step 3: Child and family-related stressor	0.22	0.03*			0.21	0.03*		
Separated from child			-2.38	2.53			0.25	0.71
Child's safety unknown			7.4*	2.96			1.34*	0.69
Family member lacked								
Needed medical care			2.7	2.62			1.02	0.61
Family member safety unknown			-0.36	2.73			-0.01	0.62

*p < .05. **p < .01. ***p < .001.

She didn't have enough milk. She went without diapers and wipes. I had to wash her clothes in my hands. So that was hard. I was crying because she was crying. I was crying because she was hungry and I didn't have [anything] to feed her.

Ten other mothers, including eight African American, one Hispanic, and one White mother, noted that, even though they were able to find shelter (e.g., at a hotel or a relative's house), they were unhappy about their children's discomfort, for example, noting their distress at seeing their children in cramped or crowded conditions, or away from their homes, friends and relatives, and belongings that typically put them at ease.

Five mothers commented that they themselves could have coped with temporary lack of food, clothing, and shelter, but they could not face seeing their children in the same situation. They noted, for example, that they would have stayed in a shelter had it not been concerns for their children's safety. Two other mothers, an unmarried, 22-year-old White, and an unmarried, 28-year-old African American, had similar sentiments about accepting clothing donations: they were comfortable wearing used clothing, but did not want that for their children.

Mothers often based their postdisaster decisions on not wanting their children to go through similar experiences. In speculating on her future, a 27-year-old, Hispanic, engaged mother described the efforts she would take to shield her four children from further harm:

I don't want to see my children go through what they did before. Lying on the street, on the grass, on chairs, on the concrete, wondering what they are going to eat. I don't want them to have to go through that again. Ever. We didn't have a source of transportation to get out. If we did, we would have [gotten] out. That's why I'm making a new start. I'm going to learn how to drive, get [myself] a car so that if we ever have to run again, we are going to run. I don't know where we will run to, but we are going to run.

Indeed, it was clear in the interviews that participants often made postdisaster decisions based on their children's, not their own, needs. Many of these decisions ($n = 17$) centered on relocation. A 28-year-old, African American, married mother of five noted how the health of one of her sons was a priority in her decision to leave New Orleans:

While being down [in New Orleans] my son had got a respiratory infection. He was hospitalized for a week. I'm not going to say it was

airborne, but no one else in the family got it. So I had to make a decision that it wasn't safe for him to be down there with the air and trash in the streets. So we moved back [to Houston] in March.

Health. Children with preexisting chronic conditions are at particular risk of health-related adverse outcomes in the aftermath of disasters, including the development of new conditions, lack of access to necessary medicines, and disruptions in ongoing medical care (Madrid & Grant, 2008; Rath et al., 2007). In our sample, nine mothers noted worries about accessing medicine and medical care for chronic conditions, such as asthma ($n = 7$) and sickle cell anemia ($n = 1$), and four noted that chronic conditions were exacerbated during the hurricane and its aftermath. A 24-year-old, African American, single mother reported that her hearing-impaired son suffered from seizure disorder and noted the difficulty she had finding care for him in the aftermath of the storm:

He had just gotten the cochlea implant and he hadn't had it turned up. So we had to find a doctor there that would do it, but we couldn't find one. My son also has seizure disorder and it was hard to find a doctor to get some more medicine for him because he was on Phenobarbital. The prescription had [run] out. We didn't have any more and we couldn't get in touch with his doctor. . . . So we had to find a pediatrician that would write him a prescription for it and that took a long time. No one would see him.

Children are more susceptible than adults to infectious diseases, dehydration, malnutrition, and fatigue in the aftermath of disasters (Dolan & Krug, 2006). Two mothers in our sample observed the direct effects of hurricane exposure on their children's health. For example, in the process of evacuating, a 24-year-old, African American single mother watched as a man carrying her newborn daughter tripped and fell underwater; subsequently, her daughter broke out in a skin rash "all over her body." When faced with their children's emerging ailments, mothers had to cope with unanticipated worries and stress. A 28-year-old, African American, mother of three described the stress she experienced when her youngest child, a 3-year-old daughter, came down with a fever during the evacuation:

I was worried about me and my little one because, at the time when we got rescued off the roof, she was burning up with a fever. She was hot and she just kept whining. At the time, all I was worried about was me and her, if we [were] going to make it through, out of the city.

A few mothers ($n = 3$) reported concerns that children would not survive the storm. A 22-year-old, African American, single mother of three stated, "I had just had my baby. She was like 2 months when the storm came. It was hard because I didn't know if she was going to make it." In each of these cases, the mothers noted their children's health ailments as among the most traumatic aspects of their hurricane experience.

Socioemotional well-being. Concerns about children's mental health are significantly predictive of maternal psychological distress (e.g., Brannan & Heflinger, 2001; Greenberger & O'Neill, 1990). Consistent with these findings, when describing their experiences in the postdisaster environment, mothers often ($n = 18$) reported that their children's emotional distress was among the most poignant of their stressors. Children's psychosocial losses, including displacement and separation from peer groups, have been found to be significantly predictive of postdisaster psychological symptoms (Wickrama & Kaspar, 2007). In the current study, 14 mothers likewise reported that their children expressed emotional distress related to missing their homes, friends, and loved ones and that their efforts to comfort their children often had little or no effect. This phenomenon was reflected in the words of a 23-year-old, African American, married mother, who noted her 3-year-old daughter's persistent longing for their pre-Hurricane home:

When we were in Georgia, she would wake up in the middle of the night and cry and say, "I don't want to stay here. I want to go to the blue house." The house [in New Orleans] is blue. She just kept saying that for months and months. She knows we [are] not at home. I had everything to comfort her. She had her own room, nothing but toys, everything to occupy her. But that still wasn't helping. She still wanted to go to the blue house.

Four other mothers noted their children's confusion and distress about lost toys. Child-related losses, particularly gifts to children from extended family members and baby pictures, were often very distressing. A 22-year-old, African American, single mother of three described the pain she and her children experienced due to the loss of personal possessions:

We lost everything. I was so hurt because I lost all her baby things. I just bought [them], and that was a lot of money. I just had my baby shower and I lost everything in there. I lost all their toys, their clothes, their beds, my bedroom set. They [were] hurt because, it was like, "Where [is] my purse?" Because they loved purses. "Where [is] my purse? Where [are] my toys?" They [were] like, "I want my stuff. I want to go back home."

When discussing prolonged dislocation, mothers shared that their children also suffered relational losses, missing extended family members and others from their predisaster communities. Disruption of social networks in the aftermath of disasters has been found to predict adverse psychological responses (Brewin et al., 2000; Kaniasty & Norris, 2009), and such disruptions are especially likely to occur when disaster survivors relocate to new communities (Magdol & Bessel, 2003). Mothers not only had to cope with these losses themselves but also had to assist their children in doing so. Such was the case for a 23-year-old, African American, married mother of four daughters (a newborn, and 2-, 4-, and 6-year-old children), who described her oldest daughter's persistent longing for loved ones:

And that's one of her things, "I can't see mama [her grandmother]." My auntie is in Cincinnati. My oldest brother is in New Jersey. . . . So that was her thing. Her family. Then she missed her friends at her school. Actually, her teacher. So that was the biggest thing. Having to explain to her that we can't go back to New Orleans. Still to this day, she wants to go back to New Orleans. She thinks that's home.

For children, relational losses were amplified by their difficulties making friends at new schools. Mothers reported overall satisfaction with their children's schools, but concern about their children not making friends and being teased, stigmatized, or bullied ($n = 5$). For example, a 30-year-old, African American, single mother described her 7-year-old son's difficulty making friends at a new school in Memphis and how this, along with her own loneliness, led to her decision to return to New Orleans:

From time to time, when he would be in class, I would have to go to the school because he would have this little crying spell because the kids would tease him on account of the way he enunciates his words and things like that. They [would] call him "proper" or something, [and] he didn't have any friends. So he just felt left out. It was just he and I up there, no family. His support system was gone, so he was lonely, and so was I. So I was like, "Okay, we're going to deal with it for a while. I'll let you finish this year in school, and then at the end of the year we're going to see what's up and then we will return."

Although several mothers ($n = 21$) reported that their children adjusted reasonably well to changes after the hurricane, with some ($n = 3$) even marveling at their children's resilience, others ($n = 9$) experienced their children's psychological symptoms as a major source of distress. Consistent with previous

research (e.g., Osofsy et al., 2007), the mothers in the study reported that their children suffered a range of difficulties, including nightmares, crying spells, loneliness, and behavioral problems. Usually, these problems were directly connected to experiences during the hurricane or changes thereafter. As was the case with a 27-year-old, Hispanic, engaged mother of four, who noted distressing symptoms among her two of her school-aged children; mothers expressed concern that the psychological effects of the hurricanes would be long-lasting:

My daughter told me yesterday she had a dream that the hurricane came again. . . . She said she woke up because she was scared. And my son is always having nightmares about it. I don't think they will ever get over it. They will always have memories.

Mothering. Parenting concerns occurred in the context of other responsibilities, including finding adequate housing, resuming employment and education, and obtaining assistance from organizations, increasing the women's vulnerability to psychological distress (Edin & Kefalas, 2007). While providing services in the aftermath of the hurricane, Madrid and Grant (2008) observed how parents put their own needs aside in caring for their children. This was evident in our sample, with three mothers reporting that they gave any available food to their children or spent donated funds solely on children's clothes and toys.

Perhaps more crucial to their psychological functioning, some mothers ($n = 9$) noted how they suppressed their anxiety, grief, and depression to protect their children from further harm. The mothers described how they hid their fears during the hurricane to keep their children calm. In reflecting on the most difficult moments since the hurricane, a 21-year-old, Hispanic, single mother of a 3-year-old boy, described how she hid her intense sadness from loved ones during Christmas 2005:

I was depressed because I wasn't able to buy my son [anything]. I took it [badly]. [Because] his birthday is on Christmas Eve. . . . It was terrible. I [have] never been like that. . . . So I felt depressed. . . . I didn't show [anybody] I was depressed, but, on the inside, it was eating me up because I had nothing to offer my child.

Emotional suppression can be detrimental to maternal mental health (John & Gross, 2004), preventing survivors from getting the support that they need from their families or mental health services and increasing their children's risk for psychological symptoms (e.g., Spell et al., 2008). The three mothers who did express negative emotions (e.g., fear, sadness) in their child's presence

felt tinges of guilt and regret. In recounting the terror she experienced during the hurricane, the 27-year-old, Hispanic, engaged mother of four remembered how her emotional expression made her children more upset:

I thought I was going to die. I was crying because they left us out there with no food, nothing, sleeping on the ground. I knew I was crying and I shouldn't [have been] because my kids were right there. So that was making him cry, too. I couldn't help it.

Mothers were caught between suppressing their emotions for the sake of their children and expressing their emotions only to feel guilty about making their children upset.

Discussion

After controlling for predisaster variables, other major aspects of exposure, and demographic variables, we found that lacking knowledge of children's safety during Hurricanes Katrina and Rita was a statistically significant predictor of postdisaster posttraumatic stress and psychological distress among a sample of lower-income mothers. The findings are consistent with those of previous researchers who have highlighted the particular burden of disasters carried by lower-income mothers (e.g., Norris et al., 2002).

To further understand the role of children in single mothers' postdisaster functioning, we drew on qualitative interviews with a subgroup of participants. In addition to concerns about children's health, participants were troubled by a lack of resources in the immediate aftermath and had to cope with their children's fears, confusion, and longing for predisaster relationships, communities, and possessions. Many young mothers put their children's needs ahead of their own and suppressed their negative emotions to protect children from further harm. When they strayed from this course, acting on their own needs and desires, or showing emotions in front of their children, they experienced guilt and worries about the potential effects on their children. This double bind of heightened worry and increased emotional suppression is likely to have jeopardized the mothers' mental health (John & Gross, 2004).

Disaster Preparedness Recommendations

Our findings have implications for policy and practice. First, we echo others' call to prioritize children and families across governmental disaster planning activities and operations (Shriver et al., 2009). Given that separations from children were significantly predictive of postdisaster maternal mental health,

systems that quickly reunite children with primary caregivers in the aftermath of disasters, including the National Emergency Child Locator Center within the National Center for Missing Children and FEMA's National Emergency Family Registry and Locator System, should be strengthened. Research and development grants to improve technologies that track missing children would be helpful in this regard (Shriver et al., 2009).

Second, disaster preparedness should also include means to fulfill survivors' basic needs, including adequate shelter, food, and clothing (Madrid & Grant, 2008), which was a primary concern of mothers in the current study. Structural barriers, including lack of adequate housing, transportation, employment and educational opportunities, and childcare, should be addressed alongside psychological concerns (Kilmer & Gil-Rivas, 2010; Weems et al., 2010). Likewise, policies that address structural barriers are needed to promote lower-income families' long-term stability and functioning.

Third, disaster policies should increase readiness of health care facilities that serve children (Dolan & Krug, 2006). Preparedness measures, such as evacuation medication packs, easily transferable immunization information systems, and electronic medical files, would protect against adverse physical and mental health outcomes among children, particularly those with chronic health conditions (Rath et al., 2007).

Last, our findings suggest the need for expanded access to empirically supported, culturally competent, and developmentally appropriate mental health services in the aftermath of disasters (Hobfoll et al., 2007; Madrid & Grant, 2008). Religious communities, housing developments, social service agencies, and community health centers that serve lower-income disaster survivors have an important role to play in identifying families in need of services. Once connected with qualified practitioners, mothers can receive treatment alongside their children, helping them to reduce their psychological distress and make use of effective parenting skills (Costa, Weems, & Pina, 2009).

Limitations

This study benefited from a large, nonclinical sample ($N = 386$) of vulnerable participants and low pre- to postdisaster attrition rate. We were able to control for predisaster functioning, which is a significant given that predisaster functioning is among the strongest predictors of postdisaster mental health problems and few researchers have access to such data (Norris et al., 2002). Despite its potential to inform postdisaster interventions, however, this study is not without limitations. First, because it was not specifically designed to assess the effects of child-related stressors on maternal functioning, few such ques-

tions were included in the quantitative surveys. Our key independent variable, lacking knowledge of child's safety during the hurricane, was assessed using a single item. Further researchers should collect more in-depth information about child-related concerns and explore the underlying processes by which survivors' child-related concerns undermine psychological well-being over time.

Finally, although our inclusion of a vulnerable group of hurricane survivors, lower-income mothers, is a strength, it limits the generalizability of the current study. Likewise, participants were community college students at baseline and therefore are not representative of all lower-income mothers who survived Hurricane Katrina. Further researchers should investigate how child-related concerns during and after natural disasters are associated with postdisaster maternal mental health in other populations. In addition, although we located more than 80% of our pre-Hurricane sample, those who were not reassessed may have suffered higher levels of child-related stressors and psychopathology. Nonetheless, by highlighting the experiences of lower-income mothers, a population that faces multiple stressors and higher risk of adverse outcomes, our findings shed light onto an underserved and understudied group and advance our understanding of psychological responses to disasters.

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Note:

In supplementary chi-squared and independent samples t-test analyses, we detected no significant differences between participants who survived both Hurricanes Katrina and Rita ($n = 117$) and those who survived Hurricane Katrina only ($n = 204$). In addition, there were no significant differences in pre-hurricane psychological distress between the two groups.

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