

## ONLINE FIRST

# Mental Health Effects of Hurricane Sandy

## Characteristics, Potential Aftermath, and Response

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**O**N OCTOBER 22, 2012, A LATE-SEASON TROPICAL system was named Sandy by the US National Hurricane Center. The system meandered for several days in warm Caribbean waters, intensifying slowly, gaining forward momentum, and passing directly over Jamaica, eastern Cuba, and the Bahamas. Sandy's outer rain bands deluged Haiti's deforested terrain, triggering severe floods and mudslides. Although Sandy was a minimal hurricane, millions were affected across 5 Caribbean nations and Puerto Rico, 100 persons were killed or reported missing, and thousands of homes were damaged. Estimated economic losses ranged from \$5 million in Jamaica to \$2 billion in Cuba.<sup>1</sup>

What catapulted this system into a "superstorm" was a rare climate event. At mid-latitudes, Sandy interacted with a polar jet stream that steered the system toward the mid-Atlantic coastline, transforming the system into a hybrid blend of posttropical cyclone and winter storm. The system's cloud canopy expanded to 1000 miles in diameter as circulating winds funneled ocean waves into the New Jersey shoreline, Long Island Sound, and New York Harbor, inundating portions of Staten Island and southern Manhattan.

In the United States, an estimated 60 million people across 24 states experienced a range of storm effects at varying intensities, including wind, rain, flood, coastal surge, and blizzard. The effects of the storm on vulnerable and fragile infrastructure produced power outages for more than 8 million residents; flooded New York City's subway system and East River tunnels; set off a major fire that destroyed 111 housing units in the Breezy Point section of Queens; disrupted communications; and created acute shortages of gasoline, food, and commodities. Sandy was blamed for 113 US deaths and damaged 200 000 homes. Costs have been estimated at \$50 billion, second only to Hurricane Katrina as the nation's costliest natural disaster.<sup>2,3</sup>

Over the past 2 decades, considerable research efforts have been focused on populations affected by natural disasters. A rapidly growing body of knowledge is now available to assist in estimating the potential mental health effects of

Superstorm Sandy and the differential risks for specific populations and communities. The availability of data from randomized controlled trials on the efficacy of interventions for trauma-exposed populations may enable better planning and implementation of prevention strategies to mitigate the adverse mental health effects of the disaster.

### The Role of Exposure

The mental health effects of any given disaster are related to the intensity of exposure to the event. Sustaining personal injury and experiencing the injury or death of a loved one in the disaster are particularly potent predictors of psychological impairment. Research has also indicated that disaster-related displacement, relocation, and loss of property and personal finances are risk factors for mental health problems such as posttraumatic stress disorder (PTSD) and depression.<sup>4,6</sup>

### Risk and Resilience

Although the mental health effects of disaster are not limited to PTSD and may include general distress, anxiety, and other psychiatric disorders,<sup>4,6</sup> PTSD is the most often studied in the aftermath of disasters.<sup>5</sup> Review of data from 284 reports of disaster-related PTSD published between 1980 and 2008 revealed that the prevalence of PTSD is generally lower after natural disasters compared with human-made and technological disasters.<sup>5</sup> Many individuals with early trauma-related symptoms of PTSD tend to recover over time and regain normal functioning.<sup>4,5,7</sup> Moreover, across all disaster types, a significant majority of the population experiences minimal mental health effects, instead displaying resilience, positive coping, and effective adaptation to the adverse circumstances.<sup>4,5</sup>

Notably, the mental health effects after a disaster vary across the exposed population. Some subgroups carry greater risk than others. While type and duration of exposure are determinants of risk for negative mental health consequences,<sup>4,5</sup> additional factors, such as sex, age, disability status, race/ethnicity, low income, and profession (eg, rescue

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and recovery), need to be considered in risk assessments and potential referrals for mental health care.

### Intervention and Prevention

Large-scale and complex disaster events such as Superstorm Sandy challenge traditional models of mental health care following single traumatic events because of their unpredictable nature, scope, and diverse aftermath. Key challenges for treating populations in such contexts include early identification of highly exposed and high-risk populations in the immediate aftermath, intervening with individuals who develop early psychiatric symptoms and are at elevated risk for developing long-term mental health problems, and effectively treating those with diagnosed disaster-related mental health problems.

In the immediate aftermath, before clinically significant psychiatric symptoms emerge, the recommended prevention approach includes (1) promoting a sense of safety, (2) calming anxiety and decreasing physiological arousal, (3) increasing self and collective efficacy, (4) encouraging social support and bonding with others, and (5) instilling hope to promote a sense of a positive future.<sup>8</sup> Applying such a strategy among high-risk groups (eg, women, children, elderly people, disabled individuals, and first responders) may ameliorate impaired functioning and reduce risks for long-term psychiatric illness. When trauma-related symptoms such as PTSD persist well beyond the initial month following the disaster, a more direct, trauma-focused intervention is required to address fear-related symptoms, such as intrusive thoughts, avoidant behaviors, sleep disturbances, nightmares, and startle reactions. Interventions aimed at enhancing fear extinction such as cognitive behavioral therapy (CBT), consisting of prolonged imaginal and in vivo exposures to memories and reminders of the traumatic event,<sup>9</sup> are safe and have shown the most promise for reducing PTSD symptoms in the intermediate and long-term aftermath.<sup>9</sup>

### Conclusions

Climate change and emergence of new forms of natural disasters, as recently evidenced in Superstorm Sandy, may foretell of future extreme incidents that are likely to present substantial threats to large populations across the United States and neighboring countries. Well-documented patterns of mental health burden postdisaster, in the immediate and long-term aftermath, require ongoing preparedness and early proactive efforts aimed at identification of at-risk individuals and appropriate psychological intervention. Given the effectiveness and safety of available trauma-focused interventions, local and federal administrations may consider establishing evidence-based strategies for mental health response to prevent extensive mental health effects and chronic disability resulting from disasters.

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