

GUEST EDITORIAL

Hurricanes and Pregnancy

Where Rose of Sharon lay covered up there came a quick sharp cry, cut off in the middle ... "It's come ... It's early" ... [They] walked her back, over and over; and the rain drummed deeply on the roof ... [The] levee of earth extended until it connected with the highway embankment on either end ... And the stream rose slowly. It edged above the place where the first dirt had been thrown ... The stream rose slowly up the side of the new wall ... [and] eddied and boiled against the bank. Then from up the stream there came a ripping crash ... And then the bank washed quickly down.

[Mrs. Wainwright] picked up a lantern and held it over an apple box. "Never breathed ... Never was alive."

John Steinbeck, The Grapes of Wrath

Like everyone on the Gulf Coast, pregnant women were swept up in Hurricane Katrina. Women gave birth in the squalor of the Superdome or in alleys while waiting for rescuers. Katrina and its aftermath cost more than 1,300 lives, caused at least \$100 billion worth of damage, and displaced over a million people (1). Among the displaced were at least 10,000 pregnant women. What will be the effects of the hurricane on their health and that of their babies?

When it comes to pregnant women, the first priority of disaster relief agencies is to provide obstetrical and neonatal care. Massive relief efforts sometimes mean that access to care for pregnant women is actually improved in the aftermath of a disaster. Reproductive health is a priority in refugee camps (2,3). Improved maternal and child care has been observed during wars (4–6) and has been suggested as a possible explanation of the unexpectedly good birth outcomes often found in wartime. We are not aware of similar studies having been performed after natural disasters, although the March of Dimes made

an extensive effort to provide prenatal care to women affected by Hurricane Katrina (7).

However, the impact of disaster extends beyond the immediate aftermath, and the impact of prenatal health extends beyond birth. Hurricanes can have a profound impact on life courses. Marriage, birth, and divorce all increased in South Carolina after Hurricane Hugo, suggesting that affected people took significant action in their close relationships (8). The psychological impacts of a natural disaster often linger as well. Disaster increases community psychopathology, and some aspects of the disaster, such as the number of lives lost, may enhance psychopathology (9). Women are more vulnerable to disaster-related psychopathology than men (10–15). Married women may be at higher risk (16), and those of low income or education are also generally at higher risk (12,13,17). In addition, pregnancy and the postpartum period are times with a baseline high risk for depression (18–22) and anxiety (23–25). Many pregnant women thus fall into categories that place them at high risk for disaster-related psychopathology.

Disasters produce a tremendous amount of psychological and physical stress. Despite the fact that stress is a relatively well-established risk factor for poor birth outcomes (26,27), very few studies have been conducted on disasters and pregnancy. Chang et al. reported that spouse casualty after an earthquake predicted low birthweight, and the overall sample had 7.8 percent low birthweight, high for Taiwan (28); increased seismic activity might spur preterm labor or fetal distress (29). An increase in spontaneous abortions was reported in the wake of a flood disaster in New York (30). Stress during pregnancy could also influence children's intellectual development: children born to women exposed to an ice storm during pregnancy had reduced language skills (31).

Health behaviors and nutrition may also be affected by a disaster. Women who are stressed or depressed are more likely to relapse to smoking. (32–34). Breastfeeding is often deemphasized in the aftermath of a disaster, because donors may provide formula in an effort to help. Mothers and medical

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personnel may not realize that most traumatized women still produce good-quality milk (35), although cases of stress-induced cessation of lactation were reported after the 1985 Mexico City earthquake (36). Other nutritional issues might also occur. Fresh produce was scarce in Jamaica during the months after Hurricane Gilbert; maternal diets were therefore low in folate during the periconceptional period, leading to increased neural tube defects 11 to 18 months later (37).

Although the effects of Hurricane Katrina may be an unusual and irreproducible circumstance, between 13 and 30 percent of the population will be subjected to a disaster of some sort at some time (38). Overall, we know surprisingly little about the impact of hurricanes and other disasters on pregnancy, and this lack of knowledge hampers planning. Cohort studies to follow up pregnant women would provide an answer but are difficult to organize in the immediate aftermath of a disaster (39). Disaster relief agencies are often reluctant to embark on research, and research agencies are often not able to provide rapid funding. While the National Science Foundation and the National Institutes of Health have mechanisms in place to fund disaster-related research, such mechanisms should be generalized and expanded to gain the knowledge needed to better plan disaster relief for women and children. Hurricane Katrina made it clear that disasters cannot be averted by hoping that they will not occur. Resilience in the face of the next hurricane will require not only reinforcing levees in New Orleans, but also strengthening the public health response, preparation, and research infrastructure.

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