

Effects of the 2011 Flood in Thailand on Birth Outcomes and Perceived Social Support

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ABSTRACT

Objective: To determine the effects of displacement due to flooding during pregnancy on birth outcomes (infant birth weight and gestational age) and the moderating effect of perceived social support on the relationship between displacement and birth outcomes.

Design: A descriptive, longitudinal study.

Setting: A university-affiliated hospital in Pathum Thani, Thailand.

Participants: Pregnant women ($N = 175$) in the third trimester that had uncomplicated pregnancies and no history of mental illness.

Methods: During pregnancy, the participants completed standardized measurements of depression symptoms, perceived social support, and questionnaires concerning the effect of the flood. After giving birth, infant birth weight and gestational age at birth were retrieved from delivery records.

Results: Seventy percent ($n = 123$) of the participants experienced displacement during the flood. The displaced women had a mean infant birth weight of 175 grams less than that of the nondisplaced women, $t(173) = -2.38, p = .02$, whereas infant gestational age was not different. Displacement and other variables explained approximately 8% of the variance in infant birth weight. The interaction term between displacement and perceived social support was statistically significant and additionally explained the variance in infant birth weight, $F(6, 168) = 3.24, p = .005$.

Conclusion: Being displaced during pregnancy due to a natural disaster affected fetal growth rather than length of gestation. Health care providers should closely monitor maternal weight gain and fetal growth of pregnant women who experience displacement. Among the displaced women, social support was associated with higher infant birth weight; therefore, high levels of perceived social support may be protective for pregnant women who experience stressful events such as displacement from flooding.

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Previous researchers have shown that pregnant women who have experienced disasters are at high risk for antenatal depression and adverse birth outcomes (e.g., preterm birth, low birth weight) (Harville, Xiong, & Buekens, 2009; Xiong et al., 2010). In 2011, 65 of 77 provinces in Thailand were declared disaster zones as a result of severe flooding that began on July 25, 2011 and persisted in some areas until January 16, 2012. Due to the monsoon season and the landfall of tropical storm Nock-Ten in north Vietnam, which borders Thailand in the north, heavy precipitation and flooding spread from the north through the northeast and the central part of Thailand (Depart-

ment of Disaster Prevention and Mitigation, 2012). The 2011 flood was described as the worst flooding in Thailand in terms of the amount of water and the number of people affected as well as the length of time of the disaster. The flood affected approximately 12.9 million people, caused 813 deaths, and damaged 2.2 million houses. More than five million people were evacuated, and 65,000 workers became unemployed. The economic impact was high at more than U.S. \$45.7 billion (National Statistical Office, 2012). Given that pregnancy is a major life event and a source of enormous stress in a woman's life (Xiong et al., 2008), pregnant women are particularly vulnerable to the effects of

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The prevalence of antenatal depression symptoms in displaced women during a natural disaster is relatively high and is worth closer investigation.

the additional stress experienced during a disaster (Buekens, Xiong, & Harville, 2006; Xiong et al., 2010).

As a result of Hurricane Katrina, social support was one of the most significant losses reported by pregnant women (Badakhsh, Harville, & Banerjee, 2010). Social support is a factor known to contribute to the health and well-being of pregnant women (Feldman, Dunkel-Schetter, Sandman, & Wadhwa, 2000; Hoffman & Hatch, 1996; Oakley, 1988; Orr, 2004). Under a threatening circumstance such as a flood disaster, where stress cannot be prevented or eliminated, the moderating effect of perceived social support is worth closer investigation.

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Disaster and Antenatal Depression Symptoms

Following Hurricane Katrina, the prevalence of antenatal depression symptoms ranged from 12.7% to 25% (Savage et al., 2010; Xiong et al., 2010), which was approximately 2 times higher than for pregnant women in general (Bennett, Einarson, Taddio, Koren, & Einarson, 2004). Hurricane Katrina affected women's lives in many ways: they lost their homes and all belongings and some even lost their jobs (Savage et al., 2010). The risk of elevated depression symptoms was also positively associated with the number of severe hurricane-related events (Xiong et al., 2010). The negative effect of a disaster affects not only the psychological health of pregnant women but also their birth outcomes.

Disaster and Birth Outcomes

The impact of disasters on birth outcomes has been studied across different types of disasters yielding similar findings (Harville, Xiong, & Buekens, 2010). For example, the rate of spontaneous abortion in western New York in 1973 was significantly higher compared to the years before and after a flood there (Janerich et al., 1981). Neuberger, Pawlosek, Lopuszanski, and Neuberger (1998) reported a high incidence rate of pregnancy losses among Polish women who were injured from a major flood in southern Poland in 1997. The incidence of low birth weight and

preterm birth significantly increased following a catastrophic flood in North Dakota, USA (Tong, Zotti, & Hsia, 2011). Following the earthquake in Taiwan, the prevalence of low birth weight significantly increased (H. L. Chang, Chang, Lin, & Kuo, 2002). It is widely recognized that the impact of a disaster on birth outcomes is determined by the severity of exposure. Pregnant women who experienced severe events of Hurricane Katrina (e.g., walking through floodwaters, significant home damage, or feeling that one's life was in danger) were more likely to have low-birth-weight infants compared to women with nonextensive experience (Xiong et al., 2008). One possible explanation is that the individual and community resources contributing to healthy pregnancy were disrupted during the disaster, including social support (Badakhsh, Harville, & Banerjee, 2010; Xiong et al., 2008), resulting in adverse birth outcomes.

Perceived Social Support and Birth Outcomes

Perceived social support, or the availability of support when it is needed, has been shown to have benefits regarding birth outcomes (Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993; Feldman, Dunkel-Schetter, Sandman, & Wadhwa, 2000; Norbeck, 1985; Pagel, Smilkstein, Regen, & Montano, 1990; Turner, Grindstaff, & Phillips, 1990). Oakley (1988) suggested that social support is relevant to birth outcomes because it can help reduce stress. The mechanism by which social support is associated with health can be explained in terms of direct and moderating effects (Cohen & Wills, 1985). Several observational studies have illustrated the direct effect of social support on birth outcomes; a higher level of social support was associated with improved birth outcomes (Orr, 2004). Although the moderating effects of social support are an appealing mechanism and provide a strategy for alleviating the impact of stress, the evidence illustrating its moderating effect on birth outcomes is limited. The 2011 flood in Thailand provided a unique opportunity to examine the role of perceived social support.

During the 2011 flood in Thailand, many women were evacuated out of the flooding area (displaced women), though some women were not directly affected by the flood (nondisplaced women). It was hypothesized that the negative consequences of the flood on psychological health and birth outcomes may have been worse among the displaced women, particularly

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