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Impact of childhood abuse on adult sleep quality among low-income women after Hurricane Ike

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ABSTRACT

Objective: The objective was to investigate the association between childhood abuse and poor sleep quality in the month following adulthood exposure to a natural disaster.
Design: Cross-sectional.
Setting: Six University of Texas Medical Branch family planning clinics located in Southeast Texas.
Participants: A subgroup of 375 low-income women aged 18 to 31 years who experienced Hurricane Ike while participating in the Stress and Health Longitudinal Study (2006-2012).
Measurements: Risk profiles considering types and frequency of childhood abuse were identified in latent class analysis performed on the Childhood Trauma Questionnaire, which was measured upon entry to the study. Associations between abuse classes with a global indicator and 7 individual components of sleep quality measured after Hurricane Ike were estimated in adjusted logistic regression models.
Results: Prevalence of poor sleep quality in the month following Hurricane Ike was 39.7%. Of the 5 classes of childhood abuse identified, the most extreme abuse class—frequent combined emotional, physical, and sexual abuse—exhibited the strongest associations with poor sleep quality after the hurricane (odds ratio: 4.30; 95% confidence interval: 1.72-10.72). Occasional emotional abuse alone was also significantly associated with poor sleep quality after the hurricane (odds ratio: 2.70; 95% confidence interval: 1.48-4.91). Several profiles of childhood abuse were also significantly associated with 6 of the 7 component indicators of sleep quality, including sleep duration, disturbances, onset latency, subjective quality, use of sleep medication, and daytime dysfunction.
Conclusions: Low-income women with histories of frequent childhood abuse, or emotional abuse specifically, have increased risk of poor sleep quality following exposure to a hurricane in adulthood.
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Introduction

Poor sleep quality is a common health concern and a defining feature of insomnia, the most prevalent sleep disorder in the adult population.[1] Sleep quality encompasses aspects of sleep duration, onset latency (trouble falling asleep), and nighttime disturbances, as well as more qualitative features of sleep such as depth and restfulness.[2] Sleep disorders are estimated to affect 50 to 70 million Americans and place a significant burden on health and well-being—individuals who experience difficulty sleeping are at increased risk for all-cause mortality as well as health conditions including psychiatric disorders, cardiovascular disease, diabetes, and stroke.[3–9] Societal costs of poor sleep include decreased quality of life, job loss, disability, and billions of dollars spent on medical care.[10,11]

Early-life exposure to traumatic events is a risk factor for poor sleep quality in adulthood.[12,13] Adverse childhood experiences of trauma including abuse, neglect, witnessing domestic violence, substance use, household mental illness, and imprisonment have all been found to be associated with subjective sleep problems.[13] In a recent review, Kajeepeta et al[12] (2015) identified emotional and physical abuse as 2 adverse childhood experiences exhibiting some of the strongest associations with sleep complaints. Greenfield et al[14] (2011) found statistically significant associations between global sleep pathology in adulthood and frequent childhood experiences of emotional and physical abuse, with sexual abuse (odds ratio [OR]: 3.65; 95% confidence interval [CI]: 1.8-7.6) and without sexual abuse (OR: 3.27; 5% CI: 1.8-5.9), as well as occasional emotional and physical abuse with sexual abuse (OR: 1.68; 95% CI: 1.1-2.7), compared with individuals with no abuse history.

A life course framework has been proposed to describe the impact of risk accrued in childhood on sleep in adulthood.[15] This framework

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is supported by evidence of a biological gradient between the number of adverse childhood experiences and relative risk of sleep disturbance in adulthood.[15,16] Anda et al (2006)[15] found that as the number of adverse childhood experiences increased from 0 to 4 or more, the risk of sleep disturbances increased 2.1-fold. Although exposure to childhood abuse is often considered a nonspecific risk factor (ie, yes vs no), evidence suggests that meaningful differences exist in type (emotional, physical, sexual) and frequency (one time, episodic, chronic) of abuse and how they relate to each other and heterogeneous health outcomes, including sleep quality.[14,17–19] For example, Noll et al[20] (2006) identified childhood sexual abuse as uniquely connected to sleep disturbances, likely because of the fact that this type of abuse often occurs in a bedroom at night. Poon and Knight[21] (2011) found that childhood emotional abuse, but not physical abuse or emotional neglect, was significantly associated with sleep complaints in adults 60 years and older ($\beta = 0.11$, $P < .05$).

Both biological and psychosocial processes may explain the association between childhood exposure to trauma and adulthood sleep outcomes.[12,20] Childhood exposure to stress or trauma is thought to impair development of neuroendocrine and neuroregulatory systems associated with circadian rhythm, which is linked to sleep quality, but this process remains unclear.[22,23] From a psychosocial standpoint, it has been suggested that children who have experienced abuse and frequent revictimization may be unable to develop or maintain healthy sleep schedules and thus go on to form unhealthy sleep patterns that persist into adulthood.[14,16–18] Anda et al[15] (2006) suggest that the biological gradient observed between number of adverse childhood experiences and comorbid outcomes in adulthood serves as evidence that childhood stress impairs brain development.

An estimated 25% to 50% of children are victims of childhood abuse, and child protective services reports may underestimate the actual prevalence of maltreatment.[24,25] Of the estimated 679,000 children reported by child protective services as victims of abuse and neglect in 2013, 79.5% were neglected, 18.0% were physically abused, 8.7% were emotionally abused, and 9.0% were sexually abused.[24] In the general population, women are more likely than men to report emotional and sexual abuse, as well as emotional neglect.[12,26,27] Women are also disproportionately affected by insufficient sleep, sleep disturbances, daytime disturbances, and dissatisfaction with sleep quality.[28–30] Women also experience higher incidence of sleep problems than men following exposure to natural disasters and other trauma.[31–33] Contributing factors to this disparity may be that women have unique risk factors which increase the propensity to develop disruptive nocturnal behaviors such as physiologic changes in neuroendocrine hormone levels related to the menstrual cycle and additional ecosocial stressors such as family caregiving responsibilities and being working mothers.[30,34]

An estimated 30% of individuals exposed to natural disasters (biological, geological, or climatic) experience sleep problems, but how childhood experiences of abuse might affect sleep following exposure to a disaster remains unknown.[14,31,35,36] Thus, the goal of this study is to examine childhood abuse risk profiles by type and frequency and their associations with sleep problems following a hurricane. Our study also aims to add to the literature concerning the impact of childhood abuse and neglect on adult sleep outcomes among low-income women specifically.

Methods

Study design and participants

Data for the current cross-sectional analysis originated from the Stress and Health Longitudinal Study, which has been described in detail.[37] Briefly, the study was conducted November 2006 through January 2012 and focused on stress and substance use among reproductive-age women. Participants were patients attending 1 of 6 University of Texas Medical Branch (UTMB) family planning clinics. Inclusion criteria for the study were as follows: female; not pregnant; age at least 18 years; non-Hispanic white, non-Hispanic black, or Hispanic; able to speak English or Spanish; and able to consent. Of 1363 women invited to participate, 886 accepted and provided consent. Participants were interviewed at baseline entry to the study, as well as at 12- and 24-month follow-up. In addition, 4 bimonthly telephone interviews were conducted between the annual interviews. The study was approved by UTMB's institutional review board.

Hurricane Ike struck the geographical study area in September 2008, the approximate midpoint of the original study. A subgroup of 409 women from the larger study was recruited to answer additional questions about experiences related to the hurricane, with the number of subgroup participants limited by patient availability at this point in the study. Subgroup participants were interviewed beginning 1 month after the hurricane and did not differ from the larger sample in age, race, education, employment status, and income.

A total of 375 women were retained for analysis. Participants in the subgroup were only excluded if they had incomplete data on sleep or childhood abuse and neglect (n = 34). No participants were missing data on age, marital status, or annual household income; less than 0.5% (n = 1) had missing data on race; and less than 1.5% of participants (n = 5) had missing data on education and employment. A total of 3.2% (n = 13) participants had missing data on psychiatric disorder diagnosis and 7.2% (n = 27) had missing data on hurricane-related stressors. In comparing participants included in the analysis (n = 375) with those excluded (n = 34), no statistically significant differences were found in sociodemographic characteristics, psychiatric disorder diagnosis, or number of hurricane-related stressors.

Measures

Childhood abuse

The Childhood Trauma Questionnaire (CTQ) is a 28-item self-administered Likert-type scale used to identify individuals with histories of abuse and neglect as children.[38] The CTQ contains 5-item subscales for emotional, physical, and sexual abuse, as well as emotional and physical neglect, respectively. Participants were instructed to indicate if item statements were "never," "rarely," "sometimes," "often," or "very often" true. The CTQ also includes a 3-item minimization/denial validity scale used to identify individuals who likely underreport abuse ("There was nothing I wanted to change about my family"; "I had the perfect childhood"; "I had the best family in the world").[38] To preserve the questionnaire's validity, participants who indicated minimization/denial on the CTQ were excluded from analysis. A description of individual CTQ items is available in Appendix A.

Childhood abuse and neglect were categorized using latent class analysis (LCA), a latent variable modeling approach that estimates class membership probabilities and item-response probabilities conditional on class membership.[39,40] Participants' responses on each CTQ item were used to estimate the number of abuse and neglect classes, respectively, as well as the size of each class.[41] In this study, LCA was performed to identify shared characteristics on the type and frequency of abuse and neglect, respectively, among participants based on responses from the 15 items related to abuse on the CTQ, as well as the 10 items related to neglect on the CTQ.[14] An advantage of LCA over other methods used to define categories of abuse and neglect is its ability to identify complex patterns of type and frequency based directly on probability distributions of participant responses, rather than researcher-defined cutoffs, which often vary across studies.[14,41]

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