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Original Research

What are the determinants of post-traumatic stress disorder: age, gender, ethnicity or other? Evidence from 2008 Wenchuan earthquake

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ABSTRACT

Objective: To estimate the prevalence of post-traumatic stress disorder (PTSD) and assess determinants related to PTSD symptoms among adult earthquake survivors after the 2008 Wenchuan earthquake in China.

Study design: Cross-sectional multicluster sample surveys with data collected from four counties.

Methods: Surveys were conducted separately in four counties in Sichuan Province, with a total of 2004 respondents. Beichuan County and Dujiangyan City were damaged more severely than Yaan County and Langzhong County during the earthquake. In total, 1890 households were represented, with a mean of 2.2 respondents per household. Data were collected using structured interviews, and the Harvard Trauma Questionnaire and Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria were used to diagnose PTSD.

Results: The prevalence rates of suspected PTSD were 47.3% ($n = 436$) in heavily damaged areas and 10.4% ($n = 93$) in moderately damaged areas. The prevalence rates of PTSD symptoms among elderly, middle aged and young adults were 55.8%, 50.2% and 28.6% ($P = 0.001$), respectively, in heavily damaged areas. Older age, female gender, unmarried/divorced/widowed, ethnic minority, death of family member, no household income and damaged household were independent risk factors for PTSD symptoms in heavily damaged areas.

Conclusion: Interventions designed to reduce PTSD among populations affected by the 2008 earthquake should focus on people without household incomes, those with damaged households and those who experienced the death of a family member. Effective, sustainable and culturally sensitive psychosocial interventions and mental health services are required, and attention should be directed to survivors who experienced the death of a family member, women and older adults following the devastating natural disaster. Governments should support income-generating activities and improve living conditions. Trained field personnel can assist with PTSD assessments and referrals, and existing rural healthcare services can be used to provide treatment for common psychiatric disorders.

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Introduction

On 12 May 2008, a powerful earthquake measuring 8.0 on the Richter Scale struck Sichuan Province in South-west China, affecting a vast area including seven other provinces (Gansu, Shaanxi, Chongqing, Yunnan, Shanxi, Guizhou and Hubei). According to national statistics, there were 69,227 deaths, 374,643 injuries and 17,923 missing individuals. In addition, approximately 4.8 million people were left homeless. It was the most devastating natural disaster in China for three decades. The immense physical devastation and emotional suffering, coupled with the dreadful feeling of loss, could have severe mental health consequences for all earthquake survivors.

Many survivors of natural disasters experience psychosocial problems (e.g. post-traumatic distress) in their adjustment to the loss of resources (e.g. housing, belongings) or loved ones (e.g. family members).^{1,2} Post-traumatic stress disorder (PTSD) is the most frequently reported psychiatric morbidity among victims of natural disasters.^{3,4} Numerous studies have documented the estimated rate of probable PTSD or PTSD symptoms among other earthquake survivors, and great disparity exists in the reported rates of PTSD symptoms between studies.^{5–8} For instance, the reported rates of PTSD symptoms following natural disasters in South-east Asia range from 8.6% to 57.3%.⁹ In addition, after the 2008 Sichuan earthquake, several studies reported estimated rates of probable PTSD or elevated symptoms ranging from 9.4% to 76.8% among younger and older survivors in different areas.^{10–14}

Older people are among the most vulnerable to the direct impact of natural disasters. However, previous studies have reported equivocal results about the psychological impacts of natural disasters on older and younger adults. Moreover, the age ranges examined have differed between studies. In a population-based sample of the 1998 flood victims in China, Liu et al. reported that elderly people were over twice as likely to develop PTSD symptoms;¹⁵ Ticehurst et al. found that elderly people were more likely to be more distressed than younger adults after an earthquake,¹⁶ and two representative national studies in Germany using clinical interviews reported higher rates of trauma exposure in older adults compared with younger and middle-aged adults.^{17,18}

In a population-based survey of elderly and younger adults from an area that was severely affected by the 2008 Sichuan earthquake, Jia et al. reported point prevalence rates of PTSD symptoms of 22.5% ($n = 138$; ≥ 60 years) and 8.0% ($n = 138$; < 60 years), respectively. The point prevalence rates of general psychiatric morbidity were 42.0% and 25.4%, respectively.¹⁹ In contrast, other studies have found that elderly people were less susceptible to psychological disorders or were consistent with the symptoms of the general population.²⁰ For instance, in a study undertaken 18 months after the 1988 earthquake in Armenia, no difference in the overall severity of PTSD symptoms was found between elderly and younger adults,²¹ and the results of an epidemiological study after Hurricane Honduras indicated that the elderly survivors were at equal risk for developing PTSD as the younger survivors.²² Frans et al. surveyed a representative national sample in Sweden and,

using a PTSD checklist, found that 73.7% of the older adults surveyed had been exposed to traumatic events. Younger and middle-aged adults showed higher rates of trauma exposure (83.0% in both samples).²³

Until recently, relatively few researchers had focused on the impact of natural disasters on psychological well-being in each gender. Understanding the impact of natural disasters on different demographic groups is critical for effective disaster planning. Prior research has shown that health-related quality of life is lower for women than for men.²⁴ Other evidence shows that older women experience greater difficulty with physical function measures than men.²⁵ Evidence from a gender by time of testing interaction suggests that women may be more vulnerable than men in a post-disaster context over time.²⁶

There is also a dearth of knowledge on the impact of earthquakes on older adults, women and ethnic minorities. As such, the primary purpose of this study was to estimate the rate of PTSD symptoms among survivors with different characteristics after the 2008 Sichuan earthquake. The secondary aim of this study was to examine potential risk factors associated with PTSD symptoms, with particular focus on gender, ethnicity, cultural context, socio-economic context and death of a family member during the earthquake, among older, middle aged and younger earthquake survivors.

Methods

Subjects

Four areas (Beichuan, Dujiangyan, Yaan and Langzhong) in Sichuan Province were selected to determine the PTSD symptoms of adults in areas that were damaged to differing extents. Beichuan County has a very large population of ethnic minorities compared with other counties in China: approximately 50% of the population is of the Qiang ethnic-minority group and 50% is of the largest ethnic group in China, the Han. Although the four areas had similar conditions (e.g. economy, geography, population size) before the earthquake, the damage caused by the earthquake was more extensive in Beichuan County and Dujiangyan County, with nearly 20,000 deaths and considerable damage to houses and property. In Yaan County and Langzhong County, there were nearly 200 deaths and moderate damage to houses and property. A survey was undertaken in the four counties between 1 and 30 August 2008. According to a door-to-door census, after the earthquake, most of the population in Beichuan County and Dujiangyan County had evacuated and were living in temporary shelters. Most of the population in Yaan County and Langzhong County were living in their original houses.

A systematic sample of both elderly and younger adults was drawn in the available villages with assistance from the local household registration department (Fig. 1). Age ≥ 65 years was classified as elderly, 35–64 years was classified as middle aged and < 35 years was classified as young. A prevalence rate of PTSD of 50% was assumed among older adults, in accordance with related studies, to determine the sample

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