

SYMPTOMS OF POSTTRAUMATIC STRESS DISORDER
AMONG HEALTH CARE WORKERS IN EARTHQUAKE-
AFFECTED AREAS IN SOUTHWEST CHINA^{1,2}

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Summary.—The symptoms of posttraumatic stress disorder and associated risk factors were investigated among health care workers in earthquake-affected areas in southwest China. 343 health care workers completed the Chinese version of the Impact of Event Scale–Revised 3 mo. after the Wenchuan Earthquake. The prevalence of probable PTSD was 19%. The significant risk factors identified for PTSD severity included being female, being bereaved, being injured, and higher intensity of initial fear. These findings suggest that PTSD is a common mental health problem among health care workers in earthquake-affected areas. The present information can be useful in directing, strengthening, and evaluating disaster-related mental health needs and interventions after an earthquake.

On May 12, 2008, at 14:28, an earthquake measuring 8.0 on the Richter scale occurred in the Sichuan province of southwest China. During the earthquake, 69,227 people were killed, 374,643 were injured, 17,923 listed as missing, and about 4.8 million left homeless. The affected area was about 440,442 km², spanning three provinces and one autonomous region. It was the deadliest and strongest earthquake to hit China since 1976.

Natural disasters such as earthquakes not only lead to economic losses, physical injuries, and deaths but also cause serious mental health problems. Previous studies have shown that posttraumatic stress disorder (PTSD) is a common mental health problem among victims of natural disasters (e.g., Başoğlu, Kılıç, Şalcıoğlu, & Livanou, 2004; van Griensven, Chakkraband, Thienkrua, Pengjuntr, Cardozo, Tantipiwatanaskul, *et al.*, 2006; Udomratn, 2008). Three months after the Wenchuan Earthquake, a survey conducted by Wang and his colleagues in two communities affected differently by the disaster in Beichuan County indicated that the prev-

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²This study was supported by the National Foundation of Natural Science (No. 30900402) China Postdoctoral Science Foundation (No. 200902143).

alences of posttraumatic stress disorder (PTSD) were 37.8 and 13.0%, respectively (Wang, Zhang, Wang, Shi, Shen, Li, *et al.*, 2009).

The health care workers in the earthquake-affected areas were both victims and relief workers. Compared with typical survivors of disaster, they may experience more stressor events. Understanding their mental health condition is essential to protecting those who protect the public. As part of the psychological relief program supported by the Institute of Psychology, Chinese Academy of Sciences, a mental health investigation was organized and conducted among health care workers in Mianzhu County and Shifang County, which were both severely affected by the earthquake. The main aims of the study were to estimate the prevalence of the symptoms of PTSD and identify risk factors for PTSD, and screen out those who needed further psychological help.

METHOD

Participants

The sample comprised 343 participants from a psychological relief program supported by the Institute aiming to promote health care workers' mental health in Mianzhu County and Shifang County. Ages ranged from 18 to 56 years. The demographic characteristics of the sample are presented in Table 1.

Measures

PTSD symptoms were assessed by using the 22-item Impact of Event Scale–Revised (IES–R; Weiss & Marmar, 1997) in which each item is rated on a 5-point Likert-type scale with anchors of 0: Not at all and 4: Extremely. The IES–R is one of the most widely used PTSD screens in trauma-related research and clinical settings (see Elhai, Gray, Kashdan, & Franklin, 2005), and has been translated into many languages including Chinese, Japanese, French, and Spanish (Weiss, 2007). Reliability and validity of the Chinese version have been well documented (e.g., Wu & Chan, 2003; Huang, Zhang, Xiang, & Zhou, 2006; Weiss, 2007). Cronbach α for the scale was .95 in the current sample.

Demographic data collected included age, sex, marital status (married or other), and educational level (less than college, college or higher). Exposure to the disaster was assessed with four items on which participants indicated: (a) whether they had been injured during the earthquake, (b) whether family members or friends died in the earthquake, (c) whether they had witnessed a death of someone during or immediately after the earthquake, and (d) the extent to which they felt intensity of "fear," "feelings of horror," and "helplessness" during and immediately after the earthquake on a 5-point Likert-type scale using anchors of 1: Not at all and 5: Extremely. The sample characteristics are presented in Table 1.

TABLE 1
SAMPLE CHARACTERISTICS (N = 343)

Variable	N	%	M	SD
Demographic variable				
Sex				
Male	105	30.6		
Female	238	69.4		
Age, yr.			32.6	9.5
Marital status				
Single/divorced/separated/widowed	116	33.8		
Married	226	65.9		
Education				
Less than college	124	36.2		
College or higher	219	63.8		
Disaster exposure indicators				
Being injured				
No	296	86.3		
Yes	47	13.7		
Being bereaved				
No	180	52.5		
Yes	163	47.5		
Witnessing death				
No	134	39.1		
Yes	208	60.6		
Intensity of initial fear			3.4	1.2
PTSD severity ^a			19.0	16.1
Probable PTSD ^b				
No	278	81		
Yes	65	19		

Note.—PTSD = Posttraumatic Stress Disorder. Numbers within categories may not sum to 343 due to some variables missing values. ^aPTSD severity was measured on the Impact of Event Scale–Revised. ^bProbable PTSD was identified by using a cut-off of a total score of 33 on the Impact of Event Scale–Revised.

Procedure

The survey was carried out about 3 mo. (90 ± 5 days) after the earthquake. The investigators included well-trained clinical psychologists, psychotherapists, and psychiatrists. Before giving self-report questionnaires to the participants, investigators obtained an oral consent and introduced the aim and significance of the survey in detail.

Data Analysis

Univariate descriptive statistics were computed for sample characteristics (sex, age, marital status, and educational level), disaster exposure indicators (being injured, being bereaved, witnessing death, intensity of initial fear), and PTSD symptomatology (probable positive case and symptom severity). The demographic variables and disaster exposure indicators were included in a simultaneous multivariate regression models

with PTSD severity as the dependent variables, in order to evaluate the significance of each predictor after controlling all the other predictors. All analyses were conducted with SPSS Version 11.5 for Windows.

RESULTS

A total of 47 (13.7%) participants were injured during the earthquake. There were 163 (47.5%) bereaved participants. A total of 208 (60.6%) participants had witnessed death. Regarding intensity of initial fear, the mean rating of participants was 3.4 ($SD=1.2$, range=1–5). In terms of PTSD severity, the mean score was 19.0 ($SD=16.1$, range=0–84). As recommended by Creamer, Bell, and Failla (2003), a probable PTSD case was identified by using a cutoff total score of 33 on the Impact of Event Scale–Revised (IES–R). According to this criterion, a total of 65 (19%) participants were identified as probable PTSD cases (see Table 1).

To evaluate the relative importance of each predictor after controlling all other predictors, the demographic variables and disaster-exposure indicators were included in simultaneous multivariate regression models with PTSD severity as the dependent variable. The results are summarized in Table 2. The significant risk factors associated with PTSD severity included being female ($B=3.85$, $\beta=.11$, $t=2.07$, $p<.05$), being injured ($B=5.67$, $\beta=.12$, $t=2.36$, $p<.05$), being bereaved ($B=5.66$, $\beta=.18$, $t=3.49$, $p<.01$), and intensity of initial fear ($B=3.01$, $\beta=.22$, $t=4.19$, $p<.01$).

TABLE 2
SUMMARY OF SIMULTANEOUS MULTIVARIATE REGRESSION
ANALYSIS FOR VARIABLES PREDICTING PTSD, SEVERITY^a

Dependent Variable	Predictor	B	r	β
PTSD severity	Female	3.85	.17	.11*
	Age	0.15	.01	.09
	Single/divorced/separated/widowed	-2.87	-.13	-.09
	Educational level	-0.24	-.01	-.01
	Being injured (yes)	5.67	.26	.12*
	Being bereaved (yes)	5.66	.26	.18†
	Witnessing death (yes)	2.73	.12	.08
	Intensity of initial fear	3.01	.14	.22†
$R^2=.16$, $F_{8,331}=8.08†$				

Note. — PTSD = Posttraumatic Stress Disorder. ^aPTSD severity was measured on the Impact of Event Scale–Revised. * $p<.05$. † $p<.01$.

DISCUSSION

The prevalence of probable PTSD was investigated among health care workers three months after the disaster in earthquake-affected areas in southwest China; in this sample, the prevalence rate was 19%. This result was comparable to those reported in the general population of survivors after a disaster (e.g., Liu, Tan, Zhou, Li, Yang, Wang, *et al.*, 2006; Udom-

ratn, 2008; Wang, *et al.*, 2009) and suggested that PTSD was also a common mental health problem among health care workers after exposure to a nature disaster.

Health care workers in disaster-affected areas are important relief workers. However, hampered by an expectation of professional resilience, their mental health problems may often be ignored. In the present study, it was not surprising to find that PTSD was also commonly experienced by these health care workers. The finding is generally consistent with previous reports about mental health problems of relief workers (e.g., Chong, Wang, Hsish, Lee, Chiu, Yeh, *et al.*, 2004; Kolkow, Spira, Morse, & Grieger, 2007; Daly, Gulliver, Zimering, Knight, Kamholz, & Morissette, 2008), and suggests that relief workers, such as health care workers, do not have assumed resistance to mental health problems after being exposed to traumatic events. Therefore, given that health care workers' duty is to protect the public, it is necessary to provide them mental health care.

Among the predictive variables of interest, women and those with more traumatic experience (being injured, being bereaved, and higher intensity of initial fear) would experience greater severity of PTSD symptoms. These findings are generally consistent with findings from previous postdisaster studies (e.g., van Griensven, *et al.*, 2006; Chou, Wu, Chou, Su, Tsai, Chao, *et al.*, 2007; Wang, *et al.*, 2009). Two interesting findings of this study should be noted. First, unlike previous reports in general populations (e.g., Lai, Chang, Connor, Lee, & Davidson, 2004; Wang, *et al.*, 2009), there was no evident association between witnessing death and PTSD symptoms in the current sample. This discrepancy may be due to specific professional experiences of health care workers. Witnessing death is not an uncommon event for health care workers, whereas it is indeed an uncommon event for the general public. Thus, the psychological response to death may be stronger for the general public than for health care workers. Second, after controlling all the other predictors, intensity of initial fear was the most important predictor for symptom severity of PTSD. Therefore, the initial exposure to a disaster plays a primary role in the development of PTSD symptomatology (Canino, Bravo, Rubio-Stipec, & Woodbury, 1990; King, King, Foy, & Gudanowski, 1996).

Several limitations to this study should be noted. First, the generalizability of the findings to all health care workers in the earthquake-affected areas following the disaster is limited by selection of a convenient sample. Second, data were collected through self-report questionnaires, which do not allow clarification by clinical judgment. Third, there may be several additional trauma exposure indicators which were not included.

Notwithstanding these limitations, this study is one of few studies investigating PTSD symptoms and risk factors among health care work-

ers following a very destructive natural disaster. The findings indicate that PTSD is also a commonly mental health problem among health care workers in earthquake-affected areas in China. Given inadequate knowledge and practices concerning the mental health of disaster victims in China, the present information can be useful in directing, strengthening, and evaluating disaster-related mental health needs and interventions after an earthquake.

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Accepted March 23, 2010.