

Full Length Research Paper

Posttraumatic stress symptoms among college students in Sichuan compared to those in Shanghai 18 Months after 2008 Sichuan 8.0 earthquake

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The youth in less developed countries are more likely to be affected by an earthquake. However, no data on predictors of stress symptoms among college students after an earthquake in less developed countries was available. This study aims to compare the posttraumatic stress symptoms among college students in Sichuan to those in Shanghai 18 months after the Sichuan 8.0 earthquake and then evaluate the predictors. The PTSD Checklist-Civilian Version (PCL-C) was used to evaluate the posttraumatic stress symptoms among college students in Sichuan ($n = 203$) and Shanghai ($n = 212$) 18 months after the 2008 Sichuan 8.0 earthquake. Then, the predictors were analyzed. The PCL-C total score of college students in Sichuan was significantly higher than that in Shanghai ($P < 0.01$). There was a significant relationship between the PCL-C total score and experiencing earthquake, degree of the seism aesthesia, injured in the earthquake and having family, friends or others known died in the earthquake ($P < 0.01$). Having family members, friends, or others known died in the earthquake was a significant predictor of stress symptoms ($P < 0.01$). This finding will help build a knowledge base for public health practitioners to plan resources and strategies for post-disaster mental health recovery programs.

Key words: Earthquake, posttraumatic stress symptoms, PCL-C, college students.

INTRODUCTION

A devastating earthquake of 8.0 Richter scale occurred in the Sichuan Province of China on May 12, 2008 (Stone, 2008; Wang et al., 2008; Parsons et al., 2008). Almost 45 million people were directly affected, among which 69,146 people were confirmed dead, 374131 were

seriously injured, and 17,516 are missing (Lui et al., 2009).

Due to the lack of advance warnings and the post disaster difficulties, earthquakes are among the most dangerous types of natural disasters (Goenjian et al., 2000). The Sichuan earthquake surely created severe psychological stresses, mainly stress-related disorders including acute stress disorder (ASD) and posttraumatic stress disorder (PTSD), for the survivors just as earthquakes happened in other countries (Lui et al., 2009; Goenjian et al., 2000; Li et al., 2009; Ranasinghe and Levy., 2007; Kun et al., 2009). In addition, the Sichuan earthquake was so astonishing that most people

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Abbreviations: ASD, Acute stress disorder; PTSD, posttraumatic stress disorder; PCL-C, the PTSD, Checklist-civilian version.

Table 1. Demographics for the study samples from Sichuan and Shanghai.

Demographics	Samples from Sichuan (n = 203) (%)	Samples from Shanghai (n = 212) (%)
Gender		
Male	53.7 (109)	59.9 (127)
Female	46.3 (94)	40.1 (85)
College grade		
First year	32.5 (66)	27.4 (58)
Sophomore	65 (132)	50.5 (107)*
Junior	2 (4)	20.3 (43)*
Senior	0.5 (1)	1.8 (4)

*P < 0.01, compared with samples from Sichuan.

in China could not avoid being affected in some way, since television news, the Internet and newspapers were filled with repetitive pictures of the mass destruction and great numbers of death during this earthquake (Li et al., 2009). The indirect exposure will also have some influence on people's psychology (Centerwall, 1992; DeLisi et al., 2003; Lamprecht and Sack, 2002).

People in less developed countries are more likely to be affected by natural disasters (Wang et al., 2000). Of the almost 3 billion people worldwide who were affected by disasters from 1967 to 1991, about 85% lived in Asia (Wang et al., 2000). College students are among the most easily affected crowd during natural disasters (Al-Krenawi et al., 2009; Roussos et al., 2005; Wang et al., 2009). A growing body of literature has addressed the psychological disorders among children and adolescents after natural disaster (Roussos et al., 2005). However, no data on predictors of stress symptoms among college students 18 months after an earthquake in less developed countries was available.

Sichuan is the province that the earthquake occurred while Shanghai is another not affected (Lui et al., 2009). The aim of the present study was to compare the posttraumatic stress symptoms among college students in Sichuan compared to those in Shanghai 18 months after the 2008 Sichuan 8.0 earthquake, and then the predictors of stress symptoms were evaluated. Regarding the predictors of stress symptoms, gender, college grade, experiencing earthquake, degree of the seism aesthesia, injured in the earthquake and having family, friends and others known died in the earthquake were considered.

METHODS

This study received ethics approval from the Tongji University Human Research Ethics Board.

Participants and procedures

18 months after 2008 Sichuan 8.0 Earthquake, the primary authors designed the questionnaire and informed consent procedures to

college students attending various classes in one of the major classroom buildings on campus in Sichuan and Shanghai. Students who gave written consent to participate completed the questionnaire at that time. Respondents in Sichuan who did not live in Sichuan and respondents in Shanghai living in Sichuan during the period of earthquake were excluded from the final sample frame. Demographics for the study samples from Sichuan and Shanghai are presented in Table 1. 415 people participated in this study, 203 from Sichuan and 212 from Shanghai. No gender difference was observed between two groups. However, respondents from Sichuan had a higher percentage of college grades with sophomore and junior students (P < 0.01, Table 1). The procedure for sampling classes was not random because availability of college students depended on instructor's permission and scheduling considerations.

Measures

Posttraumatic stress symptoms were evaluated using a self-reported questionnaire, the PTSD Checklist-Civilian Version (PCL-C). The stress symptoms include re-experiencing symptoms, avoidance symptoms and hyperarousal symptoms. The frequency of stress symptoms occurrence during the past 4 weeks was rated on a 5-point Likert scale, ranging from 0 = not at all to 4 = most of the time (Hodgetts et al., 2003; Murphy et al., 2003). The PCL-C has been validated in Chinese showing excellent internal consistency, test-retest reliability and validity just as in English (Liu et al., 2010).

Statistical analyses

The difference of gender and the college grade composition is analyzed with X^2 test. Changes in scores of the students in Sichuan and Shanghai on the PTSD Reaction Index (mean \pm SD) were analyzed by means of independent-samples T test. In preparation for regression analyses examining predictors of posttraumatic stress symptoms, correlations (Pearson r) were calculated between hypothesized predictors and the PCL-C total score. The possible predictors were gender (coded 0 = female; 1 = male), college grade (1 = first year; 2 = sophomore; 3 = junior; 4 = senior), experiencing earthquake (1 = experiencing by the respondent; 2 = experiencing by the family member; 3 = no), degree of the seism aesthesia (1 = extremely; 2 = much; 3 = a little; 4 = no), injured in the earthquake (1 = heavily injured, and still not recovered; 2 = heavily injured but recovered; 3 = lightly injured; 4 = no) and having family, friends, or others known died in the earthquake (1 = family members; 2 = friends; 3 = others know; 4 = no). The significantly correlated

Table 2. Pearson correlations among the PCL-C total score and possible predictors.

Variable	1	2	3	4	5	6	7
1. PCL-C total score	-	0.002	-0.031	-0.215**	-0.269**	-0.280**	-0.453**
2. Gender		-	0.065	-0.071	-0.005	-0.111*	-0.048
3. College grade			-	0.172**	0.232**	-0.020	0.122*
4. Experiencing earthquake				-	0.756**	0.079	0.172**
5. Degree of the seism aesthesia					-	0.149**	0.290**
6. Injured in the earthquake						-	0.448**
7. Having family, friends, or others known died in the earthquake							-

*, $P < 0.05$; **, $P < 0.01$.

Table 3. Simultaneous regression analyses for predictors of posttraumatic stress symptoms.

Predictor variable	B	SE B	β	Model R^2	Model F statistic
Experiencing earthquake	-0.415	0.363	-0.075	0.235	F = 31.857, $P < 0.001$
Degree of the seism aesthesia	-0.482	0.364	-0.09		
Injured in the earthquake	-2.042	1.056	-0.093*		
Having family, friends, or others known died in the earthquake	-4.349	0.581	-0.373***		

*, $P < 0.07$; ***, $P < 0.01$.

variables for the PCL-C total score were entered simultaneously as predictors in the regression analyses.

RESULTS

Comparison of posttraumatic stress symptoms among college students in Sichuan and Shanghai

The PCL-C total score of college students in Sichuan was 22.29 ± 5.99 , which is significantly higher than that in Shanghai (19.68 ± 3.58) 18 months after 2008 Sichuan 8.0 earthquake ($P < 0.01$). In addition, two respondents in Sichuan even achieved the PCL-C total score higher than 50.

Correlations between possible predictors and the PCL-C total score

The correlational analyses revealed a significant negative relationship between the PCL-C total score and experiencing earthquake, degree of the seism aesthesia, injured in the earthquake and having family, friends, or others known died in the earthquake ($P < 0.01$, Table 2). However, no correlation was found between PCL-C total score and gender, or college grade ($P > 0.05$, Table 2).

Independent predictors of posttraumatic stress symptoms

The regression analyses revealed that having family

members, friends, and others known died in the earthquake was a significant predictor of the posttraumatic stress symptom, with the results indicating that having family members, friends, or others known died in the earthquake was associated with higher posttraumatic stress symptom severity ($P < 0.01$, Table 3). There was also a trend toward significant for being injured in the earthquake as a predictor of posttraumatic stress symptoms ($P < 0.07$, Table 3). However, experiencing earthquake and the degree of the seism aesthesia were not predictors of posttraumatic stress symptoms ($P > 0.05$, Table 3).

DISCUSSION

Less information is available about the long-term impact of earthquake on college students. To the best of our knowledge, the present study was the first to compare the posttraumatic stress symptoms among college students in earthquake area to those remote 18 months after an earthquake. In this study it was found that the PCL-C total scores of the students in Sichuan is significantly higher than that in Shanghai. The predictors of posttraumatic stress symptoms in college students 18 months after an earthquake was also evaluated in this study. Having family members, friends, or others known died in the earthquake was found to be a significant predictor of the posttraumatic stress symptoms in the current study.

The youth are among the most easily affected ones

after an earthquake (Al-Krenawi et al., 2009; Roussos et al., 2005; Goto and Wilson, 2003). After an earthquake, television news, the Internet and newspapers will surely be filled with repetitive pictures of the mass destruction and death and the young persons can not avoid being affected, even if they did not experience the earthquake themselves (Centerwall, 1992; DeLisi, 2003; Lamprecht and Sack, 2002). However, it is still unknown whether difference exists between college students in earthquake area to those remote. The present study revealed that the severity of posttraumatic stress symptoms in Sichuan was significantly higher than that in Shanghai, indicating that the severity of posttraumatic stress symptoms of college students in earthquake area was significantly higher than those remote. As predicted, having family members, friends, or others known died in the earthquake was a significant predictor of the posttraumatic stress symptoms. However, in this study commonly known risk factors such as gender, experiencing earthquake and the degree of the seismaesthesia were not predictors of posttraumatic stress symptoms, which may be attributed to the fact that college students are well-educated and the education level is protective for psychological distress (Al-Krenawi et al., 2009; Pham et al., 2004). Further studies are needed to confirm this point in the future.

Several potential limitations of this study must be highlighted. First, the participants were not recruited by random sampling procedures and therefore, there may be some bias in the sample that reduces the ability of the results to be generated. Second, it is still unknown whether the severity of posttraumatic stress symptoms of college students has improved over the past 18 months or not, since no baseline data had been collected for this population.

A risk profile of disaster victims is critical for mental health. Despite the study's methodological shortcomings, it extends research in this area by showing that having family members, friends, or others known died in the earthquake is an independent predictor of the posttraumatic stress symptoms 18 months after an earthquake. This predictor could be extremely useful in limiting the numbers of college students that require more evaluation for PTSD. Using this predictor, it is likely that it would be more effective to define the high risk group. The findings of this study will help build a knowledge base for public health practitioners to effectively predicate the risk and plan resources and strategies needed for post-disaster mental health recovery programs.

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