Association Among Negative Life Events, Sense of Security, and Depressive Symptoms in Chinese Adolescents After the 2013 Ya'an Earthquake

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Abstract

Objective: About a fourth of Chinese adolescents developed clinically significant depressive symptoms following a disaster. However, little is known about whether and how post-trauma negative life events and a sense of security are associated with depressive symptoms in this population. This study examined the psychological experiences of Chinese young people who had experienced the 2013 Ya'an earthquake in Sichuan, China.
Methods: This cross-sectional study was conducted in 2019. A total of 693 Chinese middle school students completed a questionnaire that measured their level of depressive symptoms, trauma exposure, stressful life events, and sense of security.
Results: Results of hierarchical multiple-regression analyses showed that the level of life stress from stressful life events was positively associated with the level of depressive symptoms ($\beta = 0.416$, $P < 0.001$) and the level of the sense of security was negatively associated with the level of depressive symptoms ($\beta = -0.352$, $P < 0.001$) when analysis controlled for age, gender, and trauma exposure.
Conclusions: These findings highlight the importance of considering the influence of life stressors and the sense of security in devising measures and strategies for the prevention of the manifestation of depression among young people, particularly those who were exposed to disasters.

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Introduction

Depression is a public health issue which has become 1 of the major global burdens of disease. A systematic review reported that the pooled prevalence of depressive symptoms was 24.3% among Chinese adolescents, highlighting the importance of identifying the risk factors and preventive strategies for depression in this population.[1] In addition, it was revealed in recent systematic reviews that the prevalence of probable depression among survivors of environmental disasters could be as high as 60%, suggesting that disaster survivors were highly susceptible to developing depression.[2] While evidence in literature has highlighted that adversities and traumatic experiences are significant risk factors for a wide array of psychiatric conditions including depression, little is known regarding the modifiable predictors of depression and the related symptoms among disaster survivors.

It has been increasingly recognized that while 'big T,' (i.e., significant traumatic events that resemble those required in the DSM-5 criterion A for post-traumatic stress disorder) could have huge impacts on individuals' physical and psychological wellbeing, 'small t' (i.e., less catastrophic life events) may also be harmful.[3] A recent review has suggested that post-trauma events may be more important than pre-trauma variables in predicting mental health problems after trauma exposure as traumatic events could exacerbate the vulnerability to mental health problems conferred by other existing risk factors.[4] Therefore, the present study aimed to examine whether post-trauma life stressors would be associated with depressive symptoms among Chinese middle school students exposed to an environmental disaster, after controlling for the level of trauma exposure.

Furthermore, a sense of security is usually emphasized when working with trauma survivors. Without a sense of security and a safe environment, it could be difficult for trauma survivors to recover. On the other hand, it might serve as a modifiable psychosocial factor that contributes to the mental health of traumatized individuals. A meta-analysis of 35 studies revealed that parental mental health problems are associated with post-traumatic stress among children,[5] and this provides indirect evidence showing that interpersonal insecurity may be associated with more mental health issues among traumatized young people. It was also stated in literature that interpersonal insecurity was associated with adulthood depression for individuals experienced childhood maltreatment.[6] Nevertheless, the relationship between a sense of security and depressive symptoms among trauma-exposed adolescents still requires more studies. Therefore, this study also examined whether a sense of security would be associated with depressive symptoms after controlling for trauma exposure and post-trauma life stressors.

Methods

Participants

A cross-sectional survey study was conducted in 2019 to examine the psychological experiences of students who had experienced the 2013 Ya'an earthquake in Sichuan, China. 12 classes were randomly selected from 2 local middle schools. All students in the schools were invited to participate and fill out an anonymous pencil-paper questionnaire to assess their level of depressive symptoms, trauma exposure, life stress, and sense of security. Written informed consent was collected from participants and their parents. Questions from participants and their parents regarding the study were addressed and answered by the research team members. All participants completed the questionnaires during regular school hours with the assistance of the local teachers and research personnel. This study obtained ethics approval from Leshan Normal University (Ref: LNU-20171118a).

Measures

The anonymous questionnaire included the following self-report measures:

1) *The Centre for Epidemiological Studies Depression Scale for Children (CES-DC)*: The CES-DC is a 20-item self-report measure of depressive symptoms with acceptable concurrent validity ($r = 0.61$ with the Children's Depression Inventory).[7] The Chinese version of the CES-DC also had good internal consistency ($\alpha = 0.82$), test-retest reliability (ICC = 0.71), and good construct validity ($r = 0.63$ with the Chinese Version of the State Anxiety Scale for Children.[8]). Higher scores indicate higher levels of depressive symptoms. It had good internal consistency ($\alpha = 0.789$) in the sample of this study.

2) *The Trauma Exposure Questionnaire (TEQ)*: The TEQ is a 20-item self-report measure which was designed to assess participant's exposure to earthquake in the Chinese context.[9] For example: 'my relatives or friends were injured' and 'my father was trapped' (1 = 'did not experience,' 2 = 'heard about it from others,' 3 = 'witnessed it myself'). Higher scores indicate higher levels of trauma exposure in the earthquake. It had good internal consistency ($\alpha = 0.873$) in the sample of this study.

3) *The Adolescent Self-Rating Life Events Checklist (ASLEC)*: The ASLEC is a self-report measure of 26 common life stressors for Chinese students with good internal consistency ($\alpha = 0.85$) and test-retest reliability ($r = 0.69$).[10] For example: 'family conflicts,' and 'being shamed in public' (1 = never happened, 6 = severely affected). In this study, participants were asked to rate if they had such experiences after the 2013 Ya'an earthquake. Higher scores indicate higher levels of life stress after the earthquake. It had excellent consistency ($\alpha = 0.945$) in the sample of this study.

4) *The Security Questionnaire (SQ)*: The SQ is a 16-item self-report measure of the sense of security. The SQ has 2 factors, which are interpersonal security (8 items, e.g., 'I never dared to take the initiative to express my opinion.') and certainty control (8 items, e.g., 'I feel that life is always uncertain and unpredictable.') (1 = extremely true for me, 5 = not true for me). These subscales were internally consistent ($\alpha = 0.72$ to 74).[11] The interpersonal security subscale quantifies the feelings of security during interpersonal communication, and the certainty control subscale quantifies the sense of control over life and life uncertainty. Higher scores indicate higher levels of sense of security. Both subscales had good internal consistency ($\alpha = 0.794$ and 0.832, respectively) in the sample of this study.

Data analysis

Statistical analysis was conducted using SPSS 22.0 (IBM Corp., Armonk, New York, USA). The sample characteristics were interpreted by conducting descriptive analysis. Pearson's correlation analysis was also conducted to examine the relationships between age, trauma exposure, life stress, and sense of security, as well as depressive symptoms. To examine gender differences in depressive symptoms, an independent sample t test was adopted. Further analysis was conducted using hierarchical multiple regression to examine whether life stress and sense of security would be associated with depressive symptoms, after controlling for age, gender, and trauma exposure. Hierarchical multiple regression was used because it allows the effects of the potential confounding variables (age, gender, trauma exposure) on depressive symptoms to be controlled for, by entering them into the regression equation before the other variables of interest (life stress, interpersonal security, certainty control).[12] Therefore, this study used hierarchical regression to examine if each of the 3 variables (i.e., life stress, interpersonal security, and certainty control) would statistically improve the prediction model when the potential effects of age, gender, and trauma exposure were taken into account. Therefore, the variables were entered into the regression model, step by step, resulting in 5 models.

Results

Sample characteristics

A total of 709 Chinese middle school students completed the survey. 16 students were excluded because they provided invalid years of birth. The age of the participants (N = 693) ranged from 12 to 19 (M = 14.89, SD = 1.40). 61% of them were female and 61.5% reported direct exposure to the 2013 Ya'an earthquake (e.g., 'I was injured,' 'my father was trapped,' 'my relatives or friends were dead' as a result of the earthquake on the TEQ). 44.0% scored 20 or above on the CES-D, indicating clinically significant levels of depressive symptoms. The CES-D score was

positively correlated with age (r = 0.096, P = .012). Female participants scored significantly higher on the CES-D than male participants (M = 20.07, SD = 9.79 vs M = 17.51, SD = 10.41; t (691) = 3.272, P = 0.001).

Among the 26 life stressors studied in this study, the following had the highest average scores: 'heavy school workload' (M = 3.46, SD = 1.50), 'failed or unsatisfactory exam results' (M = 3.31, SD = 1.30), 'conflicts with classmates or friends' (M = 3.23, SD = 1.40), 'pressure to pursue a higher education' (M = 3.19, SD = 1.50), and 'family putting pressure on your study' (M = 2.95, SD = 1.52).

Relationships between trauma exposure, stressful life events, sense of security, and depressive symptoms

The CES-D score was positively correlated with the trauma (earthquake) exposure (r = 0.193, $P < 0.001$) and life stress (r = 0.443, $P < 0.001$), while it was negatively correlated with interpersonal security (r = − 0.584, $P < 0.001$) and certainty control (r = −0.564, $P < 0.001$). In addition, interpersonal security was negatively correlated with life stress (r = − 0.304, $P < 0.001$) but showed no statistically significant relation to trauma exposure (r = −0.042, P = 0.268).

A hierarchical multiple regression was conducted to examine the relationship between trauma exposure, life stress, sense of security, and depressive symptoms (see Table 1). After controlling for age, gender, and trauma exposure, the addition of life stress to the prediction of depressive symptoms (Model 3) led to a statistically significant increase in R^2 of 0.159, $F(1, 688) = 47.130$, $P < 0.001$. In this model, life stress had the strongest association with depressive symptoms (β = 0.416, $P < 0.001$). In Model 4, interpersonal security was further entered into the regression, and it led to a statistically significant increase in R^2 of 0.222, $F(1, 687) = 270.260$, $P < 0.001$. In Model 4, certainty control was also entered into the regression, and it further led to a statistically significant increase in R^2 of 0.024, $F(1, 686) = 97.586$, $P < 0.001$. In this model, although trauma exposure (β = 0.091, P = 0.002) and life stress (β = 0.224, $P < 0.001$) still had a significant association with depressive symptoms, interpersonal security (β = −0.352, $P < 0.001$) had the strongest negative relationship with depressive symptoms, while certainty control was also a significant predictor (β = −0.222, $P < 0.001$).

Limitations

This study suffers from several limitations. First, data was collected solely in Ya'an city where the earthquake happened. The findings may not be generalizable to other adolescents with traumatic experiences of a different nature. Second, there could be selection bias in this study, as the middle schools involved were selected by a non-probability sampling strategy. Third, although it is supported in literature that children/ adolescents would be able to recall and remember trauma-related memories years after traumatic events,[11] there is still a potential risk for recall bias. Fourth, given the use of cross-sectional data, the pre-existing level of depressive symptoms before the earthquake among the participants were not measured, which might create uncertainties regarding whether post-earthquake life stressors directly and solely contributed to the elevated level of depressive symptoms. The causal relationships among the variables were also unable to be examined. Despite these limitations, this study improves the understanding of depressive symptoms in terms of its associated modifiable psychosocial

Table 1. Hierarchical multiple regression predicting depressive symptoms among Chinese students (N = 693)

Variables	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	β	P	B	β	P	B	β	P	B	β	P	B	β	P
Constant	4.793		0.258	−1.854		0.673	−1.737		0.665	24.865		0.000	27.226		0.000
Age	0.684	0.095	0.012	0.587	0.081	0.028	0.158	0.022	0.522	0.268	0.037	0.201	0.284	0.039	0.166
Female gender	2.550	0.123	0.001	2.293	0.111	0.003	2.193	0.106	0.002	1.642	0.079	0.006	1.665	0.080	0.004
Trauma (earthquake) exposure				0.360	0.179	0.000	0.164	0.081	0.020	0.201	0.100	0.001	0.182	0.091	0.002
Life stressors							0.164	0.416	0.000	0.102	0.260	0.000	0.088	0.224	0.000
Interpersonal security										−0.854	−0.495	0.000	−0.607	−0.352	0.000
Certainty control													−0.344	−0.222	0.000
R^2	0.024			0.056			0.215			0.437			0.460		
Adjusted R^2	0.021			0.052			0.211			0.433			0.456		
F	8.587*			13.599*			47.130*			106.512*			97.586*		
ΔR^2	0.024			0.032			0.159			0.222			0.024		
ΔF	8.587*			23.073*			139.521*			270.260*			30.269*		

*$P < 0.001$.

factors. Longitudinal studies could be considered to further investigate the causal relationships among trauma, post-trauma life stress, the sense of security, and probable depression.

Discussion

This study found that life stress and sense of security were significantly associated with depressive symptoms among students from an earthquake-affected area, even when age, gender, and trauma exposure were controlled for. Moreover, depressive symptoms had the strongest relationship with interpersonal security, followed by life stress and certainty control. These findings contribute to literature, on the understanding of depressive symptoms in the context of trauma.

The major finding is that, compared with exposure to environmental disaster, post-trauma life stressors, and the sense of security (especially interpersonal security) had an even stronger relationship with depressive symptoms among trauma-exposed students. This is consistent with a previous study in children with serious illness, which found that life stress (or 'small t') could be more strongly associated with mental health issues than traumatic events ('big T').[13] This is also in line with recent findings showing that post-trauma stressors are more significant in the development of post-traumatic stress than pre-trauma variables.[3] A possible explanation is that traumatic experiences might exacerbate pre-existing risk factors of mental health problems and hamper the psychological resources (e.g., resilience) of individuals. The findings suggest that among traumatized adolescents, even a 'small' life event, such as academic pressure, or conflicts with schoolmates, could become toxic stress without necessary support from caregivers. These findings offer insights into to the treatment of trauma-related mental health issues that the potential impacts of both 'big T' and other 'minor' life stressors should be acknowledged when trauma-informed interventions are to be employed.

The findings imply that life stress and the sense of security are 2 modifiable factors that should receive more attention when preventing or addressing depressive symptoms among young people. Parents, childcare workers, educators, and other social service providers should make efforts to help children/ adolescents resolve, avoid, and cope with life stressors that affect their well-being, especially if they have encountered traumatic events. Indeed, a recent meta-analysis showed that school-based interventions involving the participation of parents and teachers are more effective than those targeted solely at students in improving adolescents' intra- and interpersonal capacity (e.g., self-awareness, problem-solving) to rebound from adversities.[14] The emotional needs of children/ adolescents should be properly fulfilled. They also need guidance on how to regulate their emotions under life stressors. As interpersonal security had the strongest negative association with depressive symptoms as indicated in the results, it is also important to promote a sense of security for children/ adolescents and let them feel that there are people who they can trust. Indeed, it is important to note that establishing safety and restoration of relationships are crucial for recovery after traumatic events. The findings support the recent research directions that emphasize the role of social and family support in the treatment of post-traumatic psychopathology.

Conclusions

In this study, life stress and the sense of security were found to be associated with depressive symptoms even after controlling for age, gender, and trauma exposure among middle school students who were exposed to the 2013 Ya'an earthquake. The findings indicate the importance of these 2 modifiable factors in the prevention and management of depressive symptoms among disaster exposed young people.

Abbreviations. CES-D, The Centre for Epidemiologic Studies Depression; TEQ, The Trauma Exposure Questionnaire; ASLEC, The Adolescent Self-Rating Life Events Checklist; SQ, The Security Questionnaire

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