

Acute stress reaction among victims of the 1999 Athens earthquake: help seekers' profile

GEORGIOS N. CHRISTODOULOU, THOMAS J. PAPARRIGOPOULOS, CONSTANTIN R. SOLDATOS

Department
of Psychiatry,
Eginition Hospital,
74 Vasilissis Sophias
Avenue, 11528 Athens,
Greece

Natural disasters adversely affect the lives of large populations, disrupt their social network, and result in an enormous economic damage; consequently, they constitute a major traumatic experience with ensuing psychopathology (1-5). In the case of earthquakes, this has been repeatedly documented by various groups of investigators (6-18). However, research has dealt primarily with the long-term psychosocial consequences of earthquakes (6-18), while their immediate psychological effects have not been systematically investigated. Yet, early psychological reactions to stressful life events might be a herald for the eventual development of post-traumatic stress disorder (PTSD) (19,20), a frequently disabling and long-lasting condition.

Earthquakes constitute a common type of natural disaster in Greece. This is because Greece is in an area of high seismic activity. The earthquake which struck the Athens metropolitan area on September 7, 1999 had a magnitude of 5.9 on the Richter scale and was the second strongest over the last twenty years; actually, in certain residential areas, it caused large material and considerable human casualties. The main earthquake was followed by many after-shocks of a smaller magnitude that lasted for about a couple of weeks. The death toll rose to 152; in addition, more than 25,000 individuals were evacuated, mainly in tents close to their place of residence, and a few more thousands moved permanently elsewhere.

The main purpose of the present study was to assess the diagnosis of acute stress reaction according to the ICD-10 (21) criteria among individuals seeking help at a psychological support service for earthquake victims. An additional objective was to evaluate the effect of certain risk factors which may predispose to the development of acute stress reaction in disaster victims.

METHODS

Almost immediately following the 1999 Athens earthquake, the special service for the psychological support of earthquake victims of the Department of Psychiatry of the University of Athens was mobilized. Members of this ser-

vice formed three psychosocial support units (PSU), two of them posted at the periphery of the Athens metropolitan area and one located at the Eginition Hospital (main facility of the Department of Psychiatry in the downtown Athens area). The primary aim was to provide relief from the traumatic experience and/or crisis intervention to the victims upon their request. Another major aim, however, was to investigate the acute psychological impact of the catastrophic event on these individuals.

During the six weeks of operation of the above three units, 159 subjects contacted their staff. The mean interval between the catastrophic event and the time of each subject's assessment was 8.2 ± 4.4 days (range: 2-22 days). For logistic or other reasons, 57 subjects had a rather brief contact with the PSU personnel, not allowing an assessment thorough enough for the needs of this study. Thus, only 102 subjects were clinically investigated. A team of psychiatrists conducted the assessments, after obtaining the subjects' consent.

Sociodemographic variables (sex, age, socioeconomic status, education, family status, property status, and housing conditions) were recorded. Also, data were collected on the type/extent of any personal and family material or physical damage, previous exposure to a highly stressful catastrophic event, the degree of exposure to the recent stressful event, and the preexistence of a mental disorder.

The diagnosis of acute stress reaction was made through a semi-structured clinical interview based on ICD-10 diagnostic criteria. 35 items were ascertained dichotomously as either present or absent. They were grouped into eight clusters: autonomic arousal symptoms (tachycardia, palpitations, pounding heart, sweating, trembling or shaking, dry mouth), symptoms involving chest and abdomen (difficulty in breathing, feeling of choking, chest pain or discomfort, nausea or abdominal distress), symptoms involving mental state (feeling dizzy, unsteady, faint or light-headed, derealization or/and depersonalisation, fear of losing control, fear of dying), general physical symptoms (hot flushes or cold chills, numbness or tingling sensations), symptoms of tension (muscle

tension or aches and pains, restlessness and inability to relax, feeling keyed up or mentally tense, difficulty in swallowing), dissociative symptoms (dissociative sensory or motor phenomena, dramatic behavior), 'other psychic' symptoms (withdrawal from expected social interactions, narrowing of attention, apparent disorientation, anger or verbal aggression, despair or hopelessness, inappropriate overactivity, uncontrolled and excessive grief), and other non-specific symptoms (startling, difficulty in concentrating, persistent irritability, difficulty in falling asleep). Furthermore, acute stress reaction was assessed as mild, moderate, or severe, according to the ICD-10 criteria of severity.

For the statistical handling of data, parametric (t-test) and non-parametric (chi-square or Kruskal-Wallis test) comparisons between groups were implemented.

RESULTS

Sociodemographic characteristics

Of the 102 subjects included in the study, 18.5% were males and 81.5% were females. Their mean age was 41.9 ± 13.9 years (range 18-75). In their majority, subjects were married (88%) and had children (80%); also, most of them (76.3%) had previously experienced a catastrophic event. Although 97% of the interviewees reported being indoors during the earthquake, only two had been slightly injured. 90% of the interviewees' houses had suffered repairable damages and 10% had been seriously damaged to the extent that they should be eventually rebuilt. At the time of the interview, all subjects were identified as evacuees temporarily settled in tents.

Diagnosis of acute stress reaction and prevalence of its symptoms

Of the 102 subjects included in the analysis, 87 (85.3%) fulfilled the ICD-10 criteria for acute stress reaction (30 for a mild, 29 for a moderate and 28 for a severe reaction). The remaining 15 subjects (14.7%), although presenting some symptoms of autonomic hyperarousal, did not fulfil the criteria. In the total sample, the most prevalent symptoms were either 'non-specific symptoms of stress response' (i.e., exaggerated startle response, 77.5%; difficulty getting to sleep because of worrying, 75.5%; difficulty in concentrating, 58.2%) or 'autonomic arousal symptoms' (i.e., pounding heart, 69.0%; trembling, 68.0%; dry mouth, 62.2%), while 'dissociative symptoms' (i.e., loss of ability to perform movements, 10.3%; loss of speech, 6.2%; loss of vision or hearing, 0%) were the least prevalent.

Factors related to the occurrence of acute stress reaction and its symptoms

No statistically significant difference was found between males and females in terms of the presence of the diagnosis

of acute stress reaction (89.5% of males vs. 84.3% of females) or of any of its individual symptoms. Similarly, the subjects' age was not a significant factor for the presence of the diagnosis of acute stress reaction (41.4 ± 14.0 years in subjects with the diagnosis vs. 43.8 ± 13.0 years in those without the diagnosis) or of any of its individual symptoms.

Sociodemographic variables, factors related to the recent earthquake, or the preexistence of a mental disorder did not distinguish significantly subjects with vs. without the diagnosis of acute stress reaction. The only statistically significant difference between the two groups concerned previous exposure to a stressful catastrophic event (81% in those with vs. 50% in those without the diagnosis, $p < 0.05$).

Factors related to the severity of acute stress reaction

Analysis using the Kruskal-Wallis test showed that within the group with the diagnosis of acute stress reaction ($N=87$) there were no significant differences among the three subgroups based on severity (mild, moderate, severe reaction), with respect to sociodemographic variables, factors related to the recent earthquake, and preexistence of a mental disorder. However, subjects who had previously experienced a stressful catastrophic event were significantly more prone to develop a severe acute stress reaction ($p < 0.05$).

DISCUSSION

This is a study assessing the development of acute stress reaction among earthquake victims seeking help at a special psychosocial support facility. Consequently, its results cannot be compared to those of community-based epidemiological studies. However, useful observations pertaining to the psychological profile of help-seekers can be made. Defining this profile is expected to be crucial for early detection of acute stress reaction and assessment of its severity by care providers. This may facilitate adequate case management, a prerequisite for the prevention of disabling chronic stress-related disorders.

In our sample, the majority of subjects (85%) who sought assistance at the PSU after the earthquake fulfilled the ICD-10 criteria for acute stress reaction. Even the remaining 15% had some symptoms of acute stress, particularly symptoms of autonomic hyperarousal. Among those who had an acute stress reaction diagnosis, the most frequently encountered symptoms were 'non-specific' symptoms of stress response and autonomic hyperarousal. These symptoms essentially constitute an immediate, potentially transient reaction to any traumatic experience and considerably overlap with the normally expected emotional and behavioral response to stress. The prevalence of dissociative symptoms, which according to DSM-IV are required for the diagnosis of acute stress disorder, was rather low in our sample. This is in keeping with the

findings of various studies which questioned the diagnostic significance of acute dissociative symptoms after trauma for the diagnosis of acute stress disorder, thus challenging the DSM-IV diagnostic requirements (22-24).

In contrast to the findings of previous studies, no significant differences were detected between those who developed acute stress reaction and those who did not, regarding the vast majority of variables that have been reported to influence post-disaster adjustment. Such variables include gender, age, marital and family status, occupation, education, life events (including past disaster experience), history of psychiatric disorder, personality characteristics and factors related to the traumatic event (intensity, duration, degree of exposure) (25-27). In the present study, among the variables evaluated, prior experience of a similar catastrophic event was the only one that differentiated those who developed acute stress reaction from those who did not, and distinguished between subjects with various severities of the reaction. This is in agreement with the findings of some other studies (28,29) and a recent large-scale epidemiological survey (30), which showed that cumulative stress and previous exposure to stressful life events, rather than any single recent traumatic experience, are the significant risk factors for the development of post-traumatic syndromes. The lack of significant effects of other sociodemographic factors is presumably due to the nature of the sample of this study: since subjects were help seekers, almost all of them were expected to score high in psychopathology, thus creating a 'ceiling effect' for any separate factor.

The main finding of the present study is that early reactions to a major traumatic event, such as a catastrophic earthquake, consist primarily of 'non-specific' symptoms of stress response and autonomic hyperarousal symptoms. The high prevalence of these symptoms and the relatively low frequency of other more specific acute manifestations of stress in response to trauma, particularly dissociative symptoms, are more in keeping with the ICD-10 conceptualization of acute stress reaction, which captures a broader range of peritraumatic responses than DSM-IV, wherein dissociative and PTSD-related symptoms dominate the symptom pattern of acute stress disorder. The aforementioned early post-traumatic symptoms, coupled with a previous experience of stressful events, characterize most individuals that develop an acute stress reaction. Therefore, identifying highly symptomatic individuals with a history of previous trauma should be a priority for health care providers and psychological support personnel, in order to undertake the appropriate intervention/prevention measures.

Acknowledgement

The following physicians are gratefully acknowledged for their invaluable contribution in the data collection: Drs. G. Trikkas, V. Tomaras, D. Ploumbides, M. Economou, A.

Pechlivanides, I. Zervas, A. Hatzakis, D. Pappa and M. Theodoropoulou. Dr. D. Pappa also contributed to the handling of data.

References

1. Horowitz M. Disasters and psychological responses to stress. *Psychiatr Ann* 1985;15:161-7.
2. McFarlane AC. Relationships between psychiatric impairment and a natural disaster: the role of distress. *Psychol Med* 1988;18:129-39.
3. Green BL. Evaluating the effects of disasters. *J Consult Clin Psychol* 1991;3:538-46.
4. Green BL, Lindy J. Post-traumatic stress disorder in victims of disasters. *Psychiatr Clin North Am* 1994;1:301-9.
5. Ursano RJ, McCaughey BG, Fullerton CS. Individual and community responses to trauma and disaster. Cambridge: Cambridge University Press, 1994.
6. Bland SH, O'Leary ES, Farinero E et al. Social network disturbances and psychological distress following earthquake evacuation. *J Nerv Ment Dis* 1997;185:188-94.
7. Lima BR, Pai S, Santacruz H et al. Screening for the psychological consequences of a major disaster in a developing country: Armero, Colombia. *Acta Psychiatr Scand* 1987;76:561-7.
8. Papadatos Y, Nikou K, Potamianos G. Evaluation of psychiatric morbidity following an earthquake. *Int J Soc Psychiatry* 1990; 36:131-6.
9. Pynoos RS, Goenjian A, Tashjian M et al. (1993) Post-traumatic stress reactions in children after the 1988 Armenian earthquake. *Br J Psychiatry* 1993;163:239-47.
10. Karanci AN, Rustemli A. Psychological consequences of the 1992 Erzincan (Turkey) earthquake. *Disasters* 1995;19:8-18.
11. Kato H, Asukai N, Miyake Y et al. Post-traumatic symptoms among younger and elderly evacuees in the early stages following the 1995 Hanshin-Awaji earthquake in Japan. *Acta Psychiatr Scand* 1996;93:477-81.
12. Sharan P, Chaudhary G, Kavathekar S et al. Preliminary report of psychiatric disorders in survivors of a severe earthquake. *Am J Psychiatry* 1996;153:556-8.
13. Carr VJ, Lewin TJ, Webster RA et al. A synthesis of the findings from the Quake Impact Study: a two-year investigation of the psychosocial sequelae of the 1989 Newcastle earthquake. *Soc Psychiatry Psychiatr Epidemiol* 1997;32:123-36.
14. Lewin TJ, Carr VJ, Webster RA. Recovery from post-earthquake psychological morbidity: who suffers and who recovers? *Aust N Zeal J Psychiatry* 1998;32:15-20.
15. Fukuda S, Morimoto K, Mure K et al. Effect of the Hanshin-Awaji earthquake on posttraumatic stress, lifestyle changes, and cortisol levels of victims. *Arch Environ Health* 2000;55:121-5.
16. Goenjian AK, Steinberg AM, Najarian LM et al. Prospective study of posttraumatic stress, anxiety, and depressive reactions after earthquake and political violence. *Am J Psychiatry* 2000;157:911-6.
17. Knight BG, Gatz M, Heller K et al. Age and emotional response to the Northridge earthquake: a longitudinal analysis. *Psychol Aging* 2000;15:627-34.
18. Wang X, Gao L, Shinfuku N et al. Longitudinal study of earthquake-related PTSD in a randomly selected community sample in north China. *Am J Psychiatry* 2000;157:1260-6.
19. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 4th ed. Washington: American Psychiatric Press, 1994.
20. Classen C, Koopman C, Hales R et al. Acute stress disorder as a predictor of posttraumatic stress symptoms. *Am J Psychiatry* 1998;155:620-4.
21. World Health Organization. The ICD-10 classification of mental

- and behavioural disorders. Diagnostic criteria for research. Geneva: World Health Organization, 1993.
22. Dancu CV, Riggs D, Hearst-Ikeda D et al. Dissociative experiences and posttraumatic stress disorder among female victims of criminal assault and rape. *J Traumatic Stress* 1996;9:253-67.
 23. Shalev AY, Freedman S, Peri T et al. Predicting PTSD in trauma survivors: prospective evaluation of self-report and clinician-administered instruments. *Br J Psychiatry* 1997;170:558-64.
 24. Marshall R, Spitzer R, Liebowitz M. Review and critique of the new DSM-IV diagnosis of acute stress disorder. *Am J Psychiatry* 1999;156:1677-85.
 25. McFarlane AC. The aetiology of post-traumatic morbidity: predisposing, precipitating and perpetuating factors. *Br J Psychiatry* 1989;154:221-8.
 26. Green BL. Psychosocial research in traumatic stress: an update. *J Traumatic Stress* 1994;7:341-62.
 27. Paris J. Predispositions, personality traits, and posttraumatic stress disorder. *Harv Rev Psychiatry* 2000;8:175-83.
 28. McFarlane AC. The prevalence and longitudinal course of PTSD: implications for the neurobiological models of PTSD. *Ann NY Acad Sci* 1997;821:10-23.
 29. Breslau N, Chilcoat HD, Kessler RC et al. Previous exposure to trauma and PTSD effects of subsequent trauma: results from the Detroit Area Survey of Trauma. *Am J Psychiatry* 1999;156:902-7.
 30. Kessler RC, Sonnega A, Bromet E et al. Epidemiological risk factors for trauma and PTSD. In: Yehuda R (ed). *Risk factors for posttraumatic stress disorder*. Washington: American Psychiatric Press, 1999:25-39.