ORIGINAL CONTRIBUTION
earthquake;
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The 1988 Earthquake in Soviet Armenia: A Case Study

A major earthquake devastated the Armenian Republic of the Soviet Union on December 7, 1988, resulting in thousands of deaths and injuries. In a postearthquake investigation of three towns seriously affected by the earthquake, we studied earthquake-related injury patterns, made observations on rescue and medical efforts, and postulated certain factors associated with increased morbidity and mortality. Information was obtained from official Soviet documents, interviews with survivors of the earthquake, and interviews with local, regional, and national government officials. Figures were based on assessments made by these officials in the field in the immediate postearthquake period. Out of a population of 8,500, there were 4,202 (49.4%) deaths and 1,244 (14.6%) injured (casualty rate, 64.0%). Deaths and injuries were 67 and 11 times higher, respectively, among trapped than nontrapped victims. Being outside at the time of the earthquake or having escaped to the outside from the collapsing structure was crucial for survival. Among persons found alive, 89% were rescued during the first 24 hours, mostly without the use of heavy equipment. This observation underscores the importance of swift rescuer response. As with all field surveys after disasters, there were methodological limitations to this study due to chaotic postearthquake conditions. Accordingly, results must be approached with caution. Nonetheless, these preliminary observations are striking and have generated several new hypotheses for further investigations using more sophisticated analytic methods. [Noji EK, Kelen GD, Armenian HK, Oganessian A, Jones NP, Sivertson KT: The 1988 earthquake in Soviet Armenia: A case study. Ann Emerg Med August 1990;19:891-897.]

Eric K Noji, MD, MPH, FACEP*
Gabor D Kelen, MD, FRCP(C), FACEP*
Haroutune K Armenian, MD, DrPH†
Baltimore, Maryland
Ashot Oganessian, PhD§
Soviet Socialist Republic of Armenia, USSR
Nicholas P Jones, PhD‡
Keith T Sivertson, MD*
Baltimore, Maryland

From the Department of Emergency Medicine, The Johns Hopkins Hospital and School of Medicine;* the Department of Epidemiology, School of Hygiene and Public Health,† and the Department of Civil Engineering,‡ The Johns Hopkins University, Baltimore, Maryland, and the Computer Information Center, Ministry of Health, Soviet Socialist Republic of Armenia, USSR §

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Address for reprints: Eric K Noji, MD, MPH, FACEP, Department of Emergency Medicine, The Johns Hopkins Hospital, 600 N Wolfe Street, Baltimore, Maryland 21205

INTRODUCTION

During the past 20 years, earthquakes have caused more than a million deaths worldwide. Better epidemiological knowledge of the causes of death and the type of injuries and illnesses caused by earthquakes is clearly essential for determining appropriate relief supplies, equipment, and personnel.[1-4] On December 7, 1988, an earthquake registering 6.9 on the Richter scale hit the northern part of the Armenian Soviet Socialist Republic, one of the most seismically active regions of the Soviet Union[5-8] (Figure 1). Caused by movement along a geological fault near the town of Spitak in the northwestern part of the country, the quake affected 40% of the national territory.[9,10] Of the 150 villages damaged, 58 were destroyed. A high percentage of Armenia's housing (11%) was destroyed or rendered uninhabitable, and 500,000 to 700,000 persons were made homeless.[11] Bridges, lifelines (eg, water, power, gas, sewage systems), and industrial facilities were also severely damaged.[12] The toll in human terms was devastating: approximately 40,000 persons were reported trapped in collapsed buildings — 15,000 were successfully rescued, and 25,000 bodies were recovered from the rubble. Another 31,000 were known to be injured, of whom 12,200 required hospitalization.[11,13]

We undertook this survey during the period immediately after the earthquake to assess the epidemiologic impact of the disaster and to develop an understanding of the relationships among building characteristics, occupant actions, search and rescue, medical care, and patient outcome.