

Psychological Distress Following Urban Earthquakes in California

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Presented at the First Workshop for "Comparative Study on Urban Earthquake Disaster Management," Kobe, Japan, 18-19 January 2001.

Keywords: earthquake; heart disease; Northridge; post-traumatic stress disorder; psychological morbidity; research; response; service utilization; suicide

Abbreviations:

ACD = atherosclerotic cardiovascular disease
CATI = computer-assisted telephone interviewing
IHD = ischemic heart disease
LA = Los Angeles, California USA
MMI = Modified Meccoli Index
PTSD = post-traumatic stress disorder
rdd = random-digit dialing
UCLA = University of California at Los Angeles

Received: 08 March 2001

Accepted: 20 January 2002

Web Publication: 04 November 2002

Data used in this paper were collected and processed with funds from the National

Abstract

During and following a disaster caused by a natural event, human populations are thought to be at greater risk of psychological morbidity and mortality directly attributable to increased, disaster-induced stress. Drawing both on the research of others and that conducted at the Center for Public Health and Disaster Relief of the University of California-Los Angeles (UCLA) following California earthquakes, this paper examines the extent to which research evidence supports these assumptions. Following a brief history of disaster research in the United States, the response of persons at the time of an earthquake was examined with particular attention to psychological morbidity; the number of deaths that can be attributed to cardiovascular events and suicides; and the extent to which and by whom, health services are used following an earthquake. The implications of research findings for practitioners in the field are discussed.

Bourque LB, Siegel JM, Shoaf KI: Psychological distress following urban earthquakes in California. *Prehosp Disast Med* 2001;16(3):81-90.

Background

Prior to World War II, very few reports of disasters as a social and behavioral phenomenon existed. During World War II, a number of studies of civilian behavior under the extreme stress of wartime bombings were conducted, but the results were not disseminated widely.¹⁻³

The results reported in these studies were considerably at variance with pre-war expectations and prevailing views on the behavior of people under extreme stress. For example, the research indicated that the civilian population in all of the countries affected reacted remarkably well to wartime attacks and problems. There was not the widespread personal and social disorganization that had been predicted before the war. A few of the empirical findings were that morale remained generally high, mental disorders did not significantly increase, panicky evacuations did not occur,

Science Foundation (Numbers BCS-9002754, CMS-9416470, and CMS-9411982), the Los Angeles County Department of Health Services (PO No. R41867, Billie Weiss, Principal Investigator; Award No. 95412, Debbie Davenport, Principal Investigator), the California State Department of Health (Jess F. Kraus, Principal Investigator), the Southern California Injury Prevention Research Center, and the UCLA Center for Public Health and Disaster Relief.

anti-social and criminal behavior did not escalate markedly, and suicide rates "went down".^{3,4}

Ignoring or not knowing about these findings, U.S. federal government agencies expressed concern, starting in the late 1940s, about how people might react to new war-related threats. Assuming the worst and "afraid of widespread 'panic,'" these early studies started with the idea that disasters caused extreme stress that resulted in disorganization, the breakdown of social institutions, and increased prevalence of psychological distress.⁵ Early researchers conducted field studies following both natural and technological (e.g., airplane crashes) disasters with the *major objective* of using these situations as surrogates for what might occur during an invasive war of the United States and the Americas. As documented in the earlier reports, the studies conducted in the 1950s and 1960s, noted that behavior during and after a catastrophic event was not socially dysfunctional, and that the amount and intensity of psychological distress probably did not increase during and after a disaster.

Much of the information about disasters that has been disseminated repeatedly may not be accurate, starting with the widely held belief that communities become so socially disorganized during and after a sudden-onset, catastrophic event, that people panic, social institutions cease to function, and levels of psychological distress escalate. Criminal behavior is widespread and unchecked morbidity and mortality from cardiovascular events and suicide increase, and that psychological disasters within the affected population increases to diagnosable levels. It also is assumed that these events lead to an increased use for health services. The Northridge earthquake was one of the first natural disasters for which extensive, systematic studies of health services were conducted. Using these data, this paper examines death from cardiovascular events and suicides, rates of psychological distress, and the use of health services during and after the Northridge earthquake.

Methods

Much of the data reported in this paper was acquired from one or more studies conducted by the Center for Public Health and Disaster Relief of the University of California at Los Angeles (UCLA), the Southern California Injury Prevention Research Center at UCLA, and the Injury and Violence Prevention Program of the Los Angeles County Department of Health. Research conducted by Robert Kloner and Jonathan Leor^{6,7} following the Northridge earthquake also is integrated into this report. Drawing on the research of Kloner and Leor, the extent to which mortality from cardiovascular events increased after the Northridge earthquake was examined. The UCLA and Los Angeles County studies include: 1) A survey conducted after the Loma Prieta earthquake of 17 October 1989; and 2) Three surveys conducted after the Northridge earthquake of 17 January, 1994.⁸⁻¹⁰

After the Northridge earthquake, three different probability samples of respondents, all representatives of Los Angeles County were interviewed. Wave 1 interviews were conducted with 487 residents of Los Angeles county between 10 August and 16 December 1994. Wave 2 interviews were conducted with 96 residents between 02 August

and 22 October 1995. Wave 3 interviews were conducted between 22 August 1995 and 29 May 1996.

All four surveys were conducted by telephone using a standardized questionnaire. One of the four surveys (Loma Prieta) was conducted using traditional paper-and-pencil procedures; the remaining three surveys were conducted on a Computer-Assisted Telephone Interviewing (CATI) system. All surveys were conducted by the Survey Research Center in the Institute for Social Science Research at UCLA, and the respondents were selected using random digit dialing (rdd) procedures, which were designed to represent households in the California counties from which they were drawn.⁹

All four questionnaires contained some core information in common including: 1) Where the respondent was at the time of the earthquake; 2) Who they were with and what they did during and immediately after the earthquake; 3) Whether or not the respondent or other members of the household were injured; 4) Damage to homes and neighborhoods; 5) Extent to which utilities went out; 6) Use of media to obtain information; 7) Contact with officials and agencies after the quakes; 8) Adoption of preparedness and mitigation activities before and after the index quake; and 9) Standard demographic data about the respondent and the household. The Civilian Version of the Mississippi Scale for Post-Traumatic Stress^{11,12} was included in the Loma Prieta and first Northridge questionnaire.⁹

Survey data were used to determine the number of diagnosable cases of post-traumatic stress disorder (PTSD) following the Northridge earthquake. Death certificates were used to determine the number of suicides.

Finally, using information available from surveys on the need for and kinds of assistance sought after the Northridge earthquake, the distribution and of the use of health and psychological services related to expressed need for services was examined.

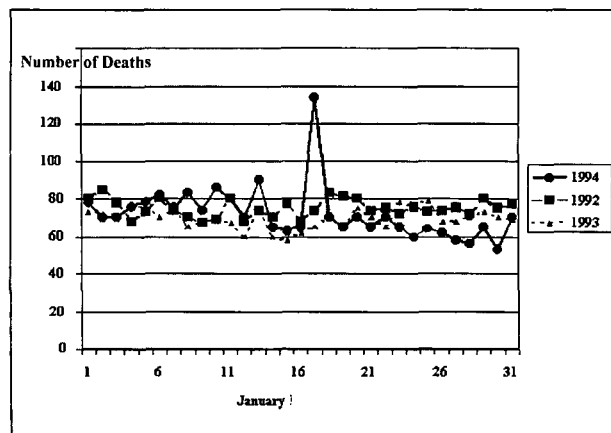
Results

Mortality Attributable to Quake-Induced Cardiovascular Events

Earthquake-related morbidity and mortality has been hypothesized to occur primarily because of the collapse of buildings and other man-made structures, but it also has been hypothesized that the stress induced by a natural disaster may increase the number of deaths from cardiovascular conditions and suicides.^{6,7,13}

On an average day in Los Angeles County, it would be expected that 60–80 deaths will occur as a result of cardiovascular events (ischemic heart disease (IHD) and atherosclerotic cardiovascular disease (ACD)).

Kloner and colleagues^{6,7} reviewed all death certificate data for January 1994 and compared them with similar data collected in January 1992 and January 1993 (Figure 1). They noted that the total number of deaths on the day of the Northridge earthquake (17 January 1994) attributable to IHD and ACD were higher ($n = 125$) than was the daily average number for the preceding 16 days ($n = 73$), but that rates dropped to an average of 57 deaths per day for the rest of the month (18–31 January 1994). Overall



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Figure 1—Number of deaths/day from atherosclerotic cardiovascular disease and ischemic heart disease immediately before and following the Northridge earthquake of January 1994 (Source: Kloner *et al* 1997)

rates of death for January 1994 did not differ from those of January 1992 and January 1993. While Kloner and colleagues concluded that there was some evidence of a “harvesting” effect on the day of the earthquake, namely that some number of persons died early from ICD and ACD, the drop in rates for the rest of January 1994 overcompensated for this increase to the extent that deaths for the rest of the population actually may have been delayed. They further noted that “. . . the increase in deaths on the day of the [Northridge earthquake] primarily were due to trauma and IHD and ACD, rather than hypertensive heart disease, cardiomyopathy, valvular heart disease, cerebrovascular diseases, and non-cardiac causes.”⁷

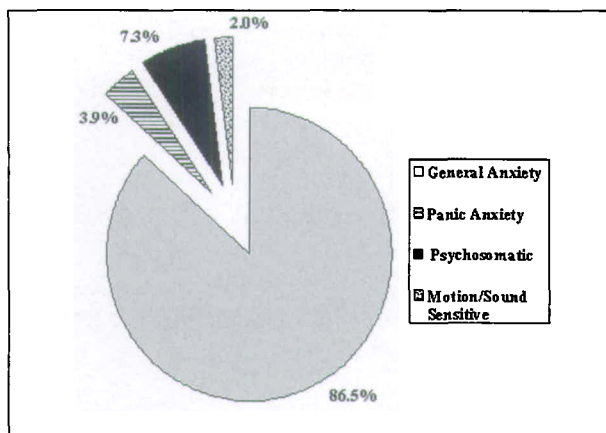
Mental Health

Reporting an Emotional Injury—The greatest problem with assessing whether psychological distress occurs during and after disasters is the lack of comparability across studies as to what constitutes evidence of such distress. The findings differed with the measure examined. Following questions on physical injuries, all respondents in the Northridge surveys were asked: “What about emotional injuries? Would you say that you had any emotional injuries as a result of this earthquake?” Thirty-three percent (579 of 1,728) of respondents reported that they were emotionally injured.¹⁴ When asked to describe their emotional injury, 86% described feelings consistent with generalized anxiety, 7% described psychosomatic symptoms, 4% described panic anxiety, and 2% reported startle response to sound or motion (Figure 2).^{15,27}

Reports of emotional injury were higher for persons who experienced more shaking as measured by Modified Mercalli Intensity (MMI) (VII [44.7%] vs. VI [25.5%]).¹⁴

Despite the high prevalence of emotional injury, only 7.9% (32 of 403) of those who said they were emotionally injured said they sought medical care for the emotional injury (Figure 3). But, an additional 10 (2.5%) persons, who reported no physical injury, actually sought medical care, which they did not report as help for an emotional injury.

Thus, it seems that some stigma remains regarding



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Figure 2—Types of emotional injuries reported after the Northridge earthquake (source: Northridge Survey, n = 579 respondents who reported emotional injuries)

admitting psychological distress even after a disaster. If extrapolated to the County as a whole, these “disguised” emotional distress cases would translate into 24,000 households having at least one person who seeks health care after an earthquake, while the reason for seeking care actually is psychological, but is presented to the medical provider as some other problem.

Civilian Mississippi Scale on Post-Traumatic Stress Disorder (PTSD)

Analyses of data collected after both the Loma Prieta and the Northridge earthquakes indicated that levels of PTSD are not elevated in response to experiences during the two earthquakes.¹⁵ Persons who were closer to the earthquakes, experienced more shaking and damage, and reported physical and emotional injuries, were no more likely than were other respondents to have elevated PTSD scores.^{12,15,27}

Persons with diagnosable PTSD were no more likely to use health services than were those without PTSD. Nineteen of 487 people had diagnosable PTSD. Eleven of those 19 (57.9%) also said they had an emotional injury, but only one of those persons had contact with a health or mental health service. In contrast, 11 (7.6%) of the 145 persons in the Northridge, Wave 1 survey who reported an emotional injury, but did not have PTSD, had contact with health or mental health services.

Suicides

While the incidence of cardiovascular deaths increased on the day of the Northridge earthquake, rates for the month as a whole were not elevated.^{6,7} There was no evidence that suicide rates increased in Los Angeles County following the Northridge earthquake (Figure 4).¹⁶ And, in fact, the annual rates for suicide during 1994 (11.8/100,000 population) actually were lower than were those for either 1993 (13.8/100,000 population) or 1995 (12.4/100,000 population) suggesting that there was a slight downward trend for suicides during the 1990's.

When the suicide rates/100,000 population for the three

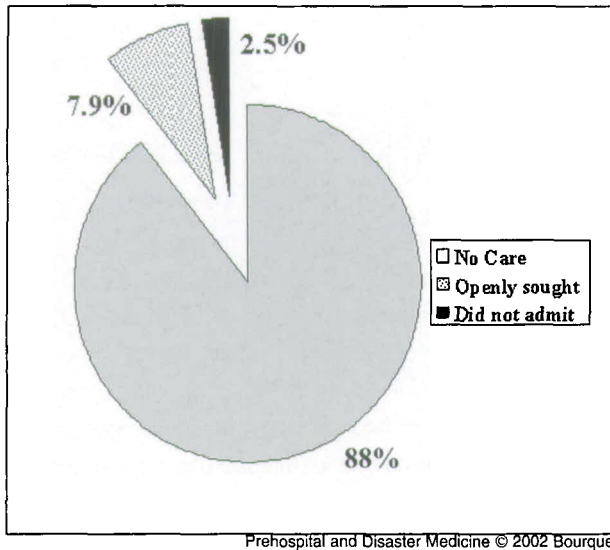


Figure 3—Use of health services used by those who reported emotional injuries following the Northridge earthquake (Source; Northridge Survey, Wave 3 n = 403)

years (1991–1993) preceding the earthquake (13.8/100,000 population) are pooled and then compared to the rates for the three years (1994–1996) that followed the earthquake (11.8/100,000 population) there is a statistically significant decrease in the suicide rate (-3.85 ; $p < 0.05$).

Use and Knowledge of Health Services—Many agencies provide assistance during a disaster.^{8,10,17,18} These include police and fire departments, federal agencies such as the Federal Emergency Management Agency (FEMA), and a variety of health agencies. In Los Angeles County after the Northridge earthquake, hospitals and emergency departments, the Los Angeles County Department of Health, and community clinics provided health care to earthquake victims. In fact, public health nurses from the Los Angeles County Department of Health, along with police and fire departments, were among the first groups that provided assistance out into the community after the earthquake.

Use of Health Services—In spite of the wide variety of services available in the community, it was noted above that very few psychologically distressed persons actually sought medical care. Using Northridge data collected during Wave 3, the analysis was broadened to examine the extent to which people used health services, not only for emotional injuries, but also for physical injuries, for replacement of medications and health aids, and the kinds of services used. Thirty-one percent of the 102 people with physical injuries used services, while 17% of the 403 persons with emotional injuries used services including those people that did not admit to using services for an emotional injury. However, 91% of the 11 people with medication problems and 97% of the 32 persons who had problems with health aids used some kind of health service (Figure 5).

Despite the fact that within hours of the Northridge earthquake, public health nurses from the Los Angeles County Department of Health were out in the community

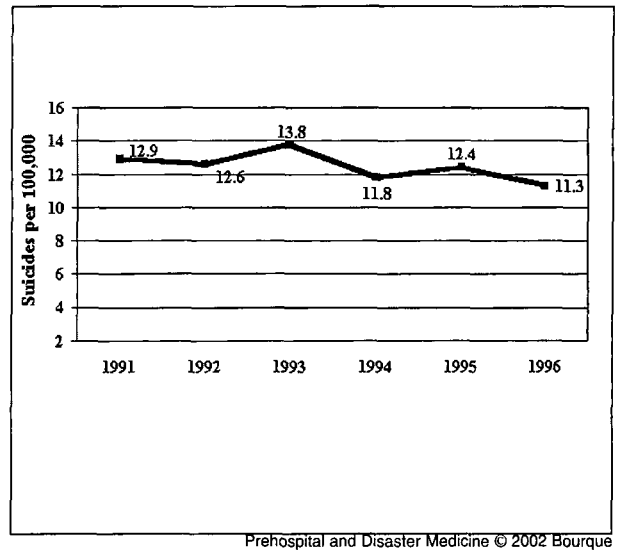


Figure 4—Suicide rates per 100,000 population in Los Angeles County, 1991–1996 (Source: Death certificates data, Los Angeles county Department of Health Services)

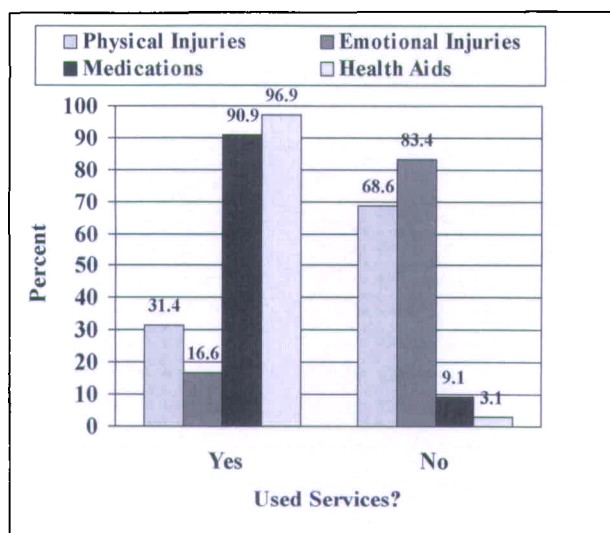
providing services and that hospitals and community clinics provided services, most people did not use one of these readily available services (Figure 6). Of those who used services, 3% of those with physical injuries and 7% of those with emotional injuries used a community clinic or center, and 9% of each of those groups used LA County services. A greater proportion of the people used hospitals with 22% of those with physical injuries, 12% of those with emotional injuries, 30% of those who needed medications, and 16% of those who needed health aids going to a hospital for care.

The overwhelming majority of all groups sought care somewhere else. These places included private doctors, neighbors, friends, Disaster Medical Assistance Teams (DMATs), and veterinarians. Since “official statistics” depend primarily on hospitals to provide estimates of injuries after a disaster, only those injuries and medical problems that present at a hospital are likely to be included in official statistics.

Knowledge about Health Services—Given the relatively few people who took advantage of medical services that were made available after the earthquake, an important question is whether people in areas affected by a disaster actually know about the services that did exist. When people do not know about services, they cannot use them.

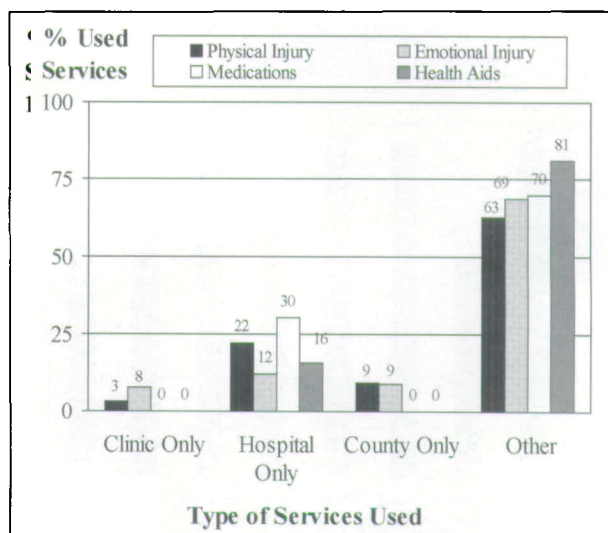
Health professionals often express concern about people who do not obtain services that they need. The same concern is relevant during a disaster. Do the people who need services, get them? For example, people with more education and higher incomes use more health services and use them more effectively than do persons with less education and lower incomes. Does the same thing happen after an earthquake or other disaster?

To examine whether Los Angeles County residents knew about health services that they could have used, the characteristics of the individual, such as their education,



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Figure 5—Use of health services after the Northridge earthquake by those with physical injuries (n = 102), emotional injuries (n = 403), problems with medications (n = 32), and problems with health aids (Source: Northridge Survey, Wave 3)



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Figure 6—Types of health services used after the Northridge earthquake by those who used services for physical injuries (n = 32), emotional injuries (n = 67), problems with medications (n = 10), and problems with health aids (n = 31) (Source: Northridge Survey, Wave 3)

immigrant status, and linguistic isolation, were examined. In addition, the characteristics that described their exposure to the earthquake were studied, e.g., Did their exposure to the shaking (MMI) predict their knowledge of the different kinds of health services available to them (hospitals and emergency departments; health centers and clinics, and the Los Angeles County Department of Health.)

If people knew about services that they needed because of their experiences during and after an earthquake, it could be expected that the MMI would predict their knowledge about the various services. If, in contrast, some people do not have access to needed services, one would expect that knowledge of services is predicted primarily by having a high education, not being an immigrant, and not being linguistically isolated. In this context, “linguistic isolation” means people who do not know enough English to function outside of their home.

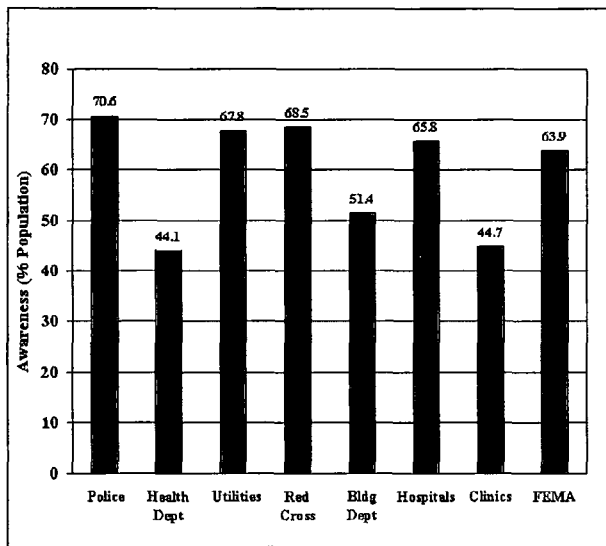
The extent to which respondents interviewed in Wave 3 of the Northridge survey knew about some of the agencies that provided services in Los Angeles County after the Northridge earthquake is illustrated in Figure 7. People were most likely to know that the police, the utility companies, the Red Cross, and hospitals helped people after the quake. People were less likely to know that city and county building departments provided assistance after the earthquake, and less than 50% of LA County residents knew that the Los Angeles County Health Department and community health clinics provided help—this in spite of the fact that County Public Health nurses were one of the first groups to move out into the community after the earthquake.

The nine panels (a-i) of Figure 8 indicate how knowledge of the three health services varied with: 1) MMI and the respondent’s level of education; 2) MMI and whether the respondent was an immigrant; and 3) MMI and whether the respondent was part of a linguistically isolated house-

hold. In each of the charts, the MMI is included to represent exposure to the earthquake. The other three variables, (level of education, immigration status, and linguistic isolation) are included because they represent characteristics of individuals that often facilitate or discourage use of health services. The problems faced by immigrants and the linguistically isolated in accessing health care are of particular concern in Los Angeles County, where a substantial proportion of the population is comprised of recent immigrants.

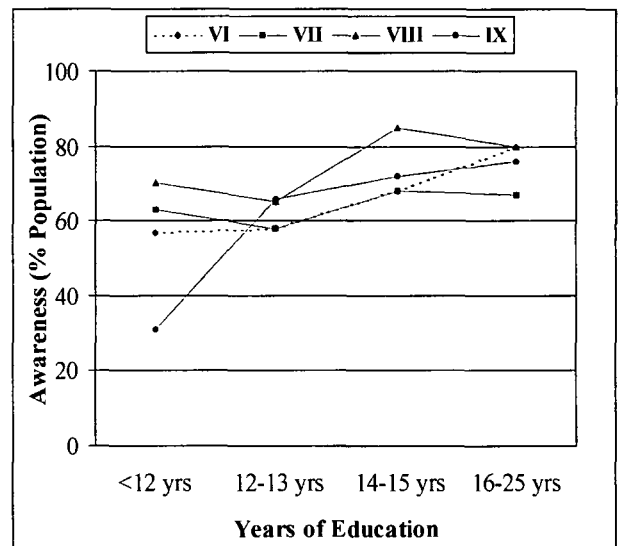
The knowledge about available hospital services varied only slightly with levels of education ($p < 0.001$), but not with exposure to the level of the shaking (Figure 8a). In contrast, while knowledge about hospital services did not vary with immigration status in areas of low levels of shaking (MMI VI and VII) (Figure 8b), differences in knowledge between immigrants and non-immigrants were striking for those persons that were within the most heavily affected areas of the County. In areas of MMI IX, immigrants were only half as likely as non-immigrants (40% vs. 80%) to know that hospitals were providing services ($p < 0.001$). Thus, in the areas in which Los Angeles County residents were most at risk of physical and emotional injury and loss of prescription medicines and health aids, immigrants—who may be least able to access medical services—were least likely to know that hospitals were providing services. Similarly, the linguistically isolated in highly affected areas did not know that hospitals provided services after the earthquake ($p < 0.01$) (Figure 8c).

In spite of the amount of time that the LA County Health Department spent in the community after the earthquake, particularly in the highly affected areas of the County, persons in the highly affected areas were no more likely to know about them than were those in less affected areas. Similarly knowledge of the Health Department did not differ with education (Figure 8d), nor with immigration status



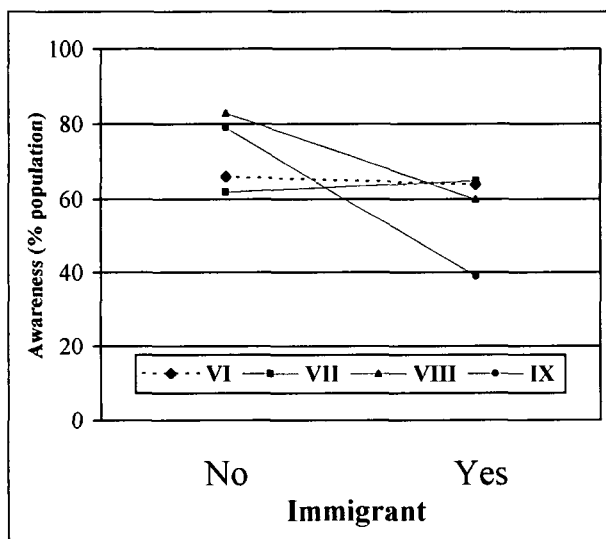
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Figure 7—Agencies respondents knew provided services after the Northridge earthquake (Source; Northridge Survey, Wave 3, n = 1,247)



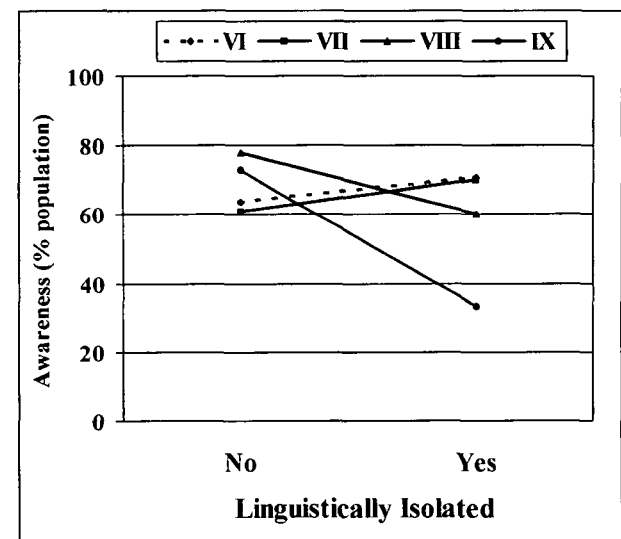
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Figure 8a—Knowledge of hospitals and emergency departments by Modified Mercalli Intensity and educational status. Main differences in effects of education are significant statistically ($p < 0.0001$)



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Figure 8b—Knowledge of hospitals and emergency departments by Modified Mercalli Intensity and immigrant status. Main differences in effects for immigration are significant statistically ($p < 0.0001$)



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Figure 8c—Knowledge of hospitals and emergency departments by Modified Mercalli Intensity and linguistic isolation. Main differences in effects for linguistic isolation are significant statistically ($p < 0.001$)

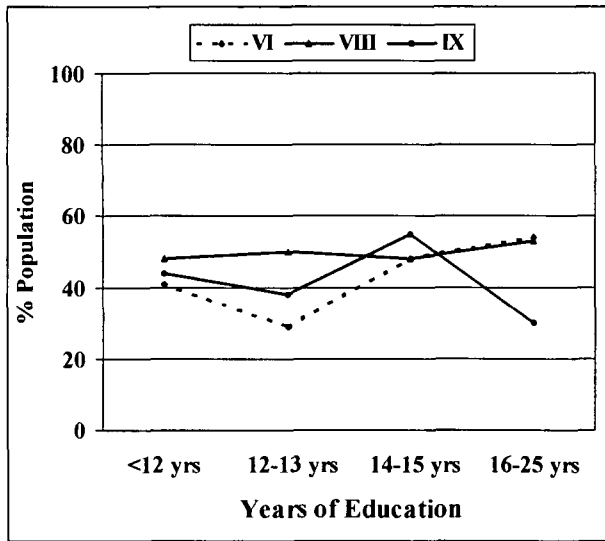
(Figure 8e). To the extent that anybody knew about the health department, immigrants were as likely as others to know about them (Figures 8d, 8e, and 8f). Similarly, the linguistically isolated were no more or less likely than other County residents to know that the County Health Department was providing services after the earthquake (NS)(Figure 8f).

Similar patterns were observed for those who knew about the community clinics that were active after the earthquake. There was no dose-response relationship between knowing

about clinics and either exposure to the quake or amount of education (Figure 8g). Knowledge of clinics did not differ with immigration status (Figure 8h) or with whether or not a person was linguistically isolated (Figure 8i).

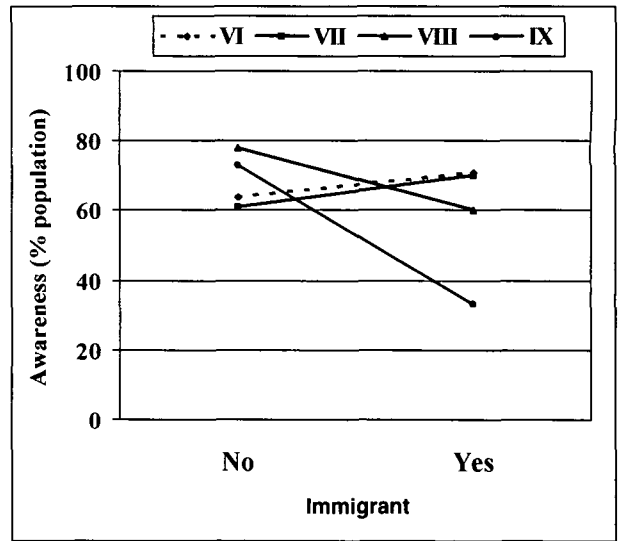
Discussion

Although it has long been hypothesized that community residents experience psychological distress after natural disasters and increased mortality attributable to disaster-caused stress, research conducted in California after recent



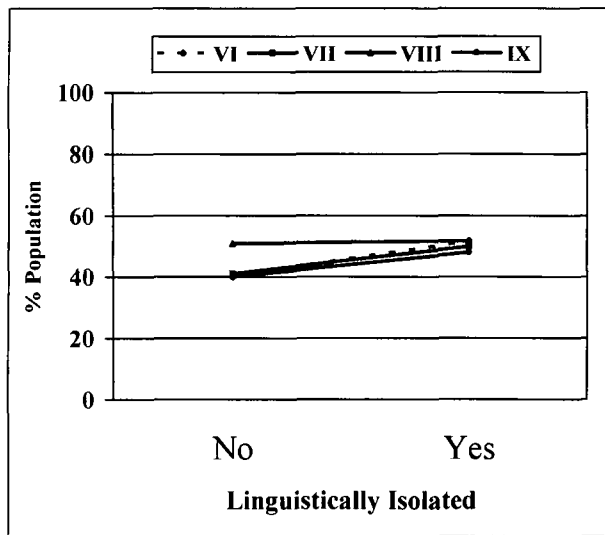
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Figure 8d—Knowledge of Los Angeles County Department of Health by Modified Mercalli Intensity and educational status. Main differences in effects for educational status are not significant statistically.



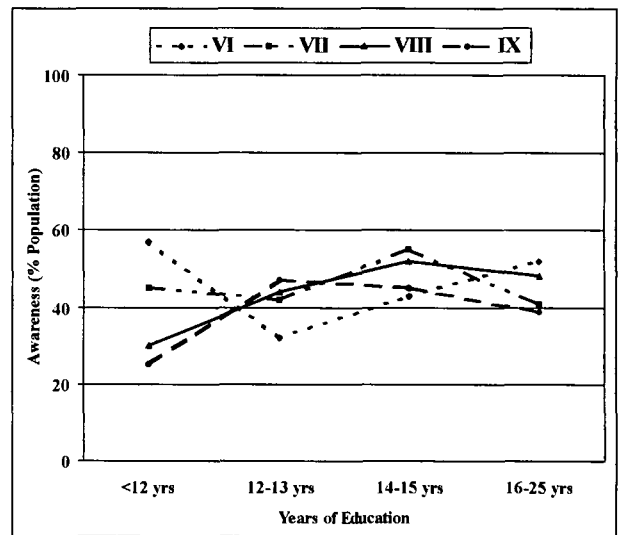
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Figure 8e—Knowledge of Los Angeles County Department of Health by Modified Mercalli Intensity (MMI) and immigrant status. Main differences between MMI groups are not significant statistically.



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Figure 8f—Knowledge of Los Angeles County Department of Health by Modified Mercalli Intensity (MMI) and linguistic isolation. Differences between MMI groups are not significant statistically.



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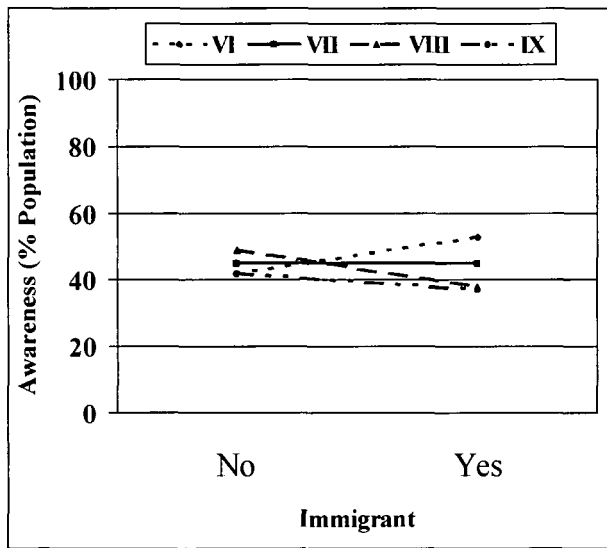
Figure 8g—Knowledge of community clinics by Modified Mercalli Intensity (MMI) and educational status. Differences by groups according to MMI are not significant statistically.

earthquakes does not support these hypotheses.

Cardiovascular Mortality

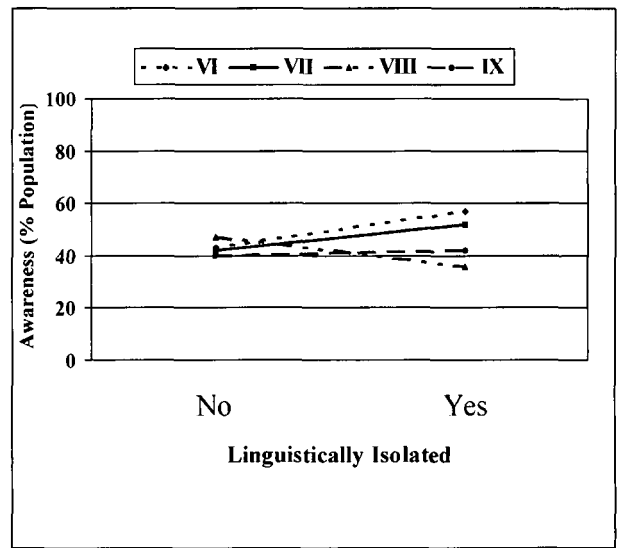
There was no clear evidence that cardiovascular events increased after the Northridge earthquake. While hospitals and emergency departments can expect an increase in the incidence of cardiovascular distress in the immediate aftermath of a catastrophic event, rates tend to drop rapidly back to or below the community's endemic level once the disaster period has passed.

The findings in the current analysis generally are consistent with research conducted by Trichopoulos *et al*¹⁹ following the Athens earthquake of 1981 and Suzuki and colleagues²⁰ and Kario and Ohashi²¹ following the Hanshin-Awaji earthquake of 17 January 1995. However, in both of these latter studies, death rates associated with cardiovascular events remained elevated at five days and three months following the quake. The reasons for these differences are not clear. Possibly the differences between these studies are related to the degree of preparedness of



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Figure 8h—Knowledge of community clinics by Modified Mercalli Intensity (MMI) and immigrant status. Differences by groups according to MMI are not significant statistically.



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Figure 8i—Knowledge of community clinics by Modified Mercalli Intensity (MMI) and linguistic isolation. Differences by groups according to MMI are not significant statistically.

the populations for such an event. Levels of preparedness differ across the communities studied: the groups that are “most prepared” may be less stressed which in turn may lead to fewer cardiovascular events in the wake of an earthquake. The differences in the intensity of the disruptions associated with the events may account for some of these differences. Part of the differences could be explained by the different rates of mortality and serious physical injury resulting from the respective quakes. Lastly perhaps, the differences observed are related to cultural factors not reflected in any of the above factors, or perhaps to none of these factors or to a combination of these factors.

Mental Health

It often has been hypothesized that disasters result in psychological distress with particular attention to symptoms of the post-traumatic stress disorder (PTSD).^{22–26} The biggest problem in assessing whether psychological distress occurs during and after catastrophic events is the lack of comparability across studies as to what constitutes evidence of such distress. Many researchers have designed their own measures of psychological distress with the result that the measures used never have been validated, comparability does not exist across studies; others have used ecological measures such as changes in community rates of alcohol use, suicide, and heart attacks as proxies for psychological distress. More recently, researchers have included standard measures in disaster studies that were developed to assess psychological symptomatology in general community studies, including the Symptom Checklist 90 (SCL-90), the Brief Symptom Inventory (BSI), the Civilian Mississippi Scale for Post-Traumatic Stress Disorder (C Mississippi Scale), and the Diagnostic Interview Schedule, Disaster Supplement (DIS/DS).²³

Results differ with the kinds of measure used. Measures

unique to a particular study generally indicate augmented post-event psychological distress, while standardized measures less often have indicated increased levels of distress. Krug, Kresnow, Peddicord, *et al*²⁶ reported that suicide rates increased in counties that experienced a single, federally declared disaster between 1982 and 1989, but later had to retract their conclusions because of analytical errors.²⁴ Using the DIS/DS, Robins, Fischbach, Smith, *et al*²³ reported no elevation in psychological symptomatology in St. Louis following tornado, dioxin, and flood disasters, while Norris and Perilla²⁸ reported elevated scores on a modified version of the C Mississippi Scale that correlated with exposure to Hurricanes Hugo and Andrew.

Use of the Civilian Mississippi Scale of Post-Traumatic Stress Disorder (C-Mississippi Scale)¹¹ in the Loma Prieta and Northridge (Wave 1 only; n = 506) studies was included in this study both because of the hypotheses of other researchers and because we believed that PTSD symptoms, rather than other kinds of psychological symptoms, most logically would occur after an earthquake. Furthermore, it was hypothesized that a dose-response effect would be seen with persons who were closer to the epicenter and who experienced more damage and dislocation manifesting higher levels of PTSD. In fact, we were wrong. Unlike emotional injury, respondents who experienced more shaking as measured using MMI were not more likely than were other respondents to meet the criteria for being a case.¹⁵

In summary, 33% of Los Angeles County residents reported being emotionally injured after the Northridge earthquake, and emotional injury increased with increased exposure to the earthquake. In contrast, PTSD rates did not vary with exposure, and suicide rates actually dropped. Persons with diagnosable PTSD did not seek care from health and mental health services, while 8% of those with an

emotional injury admitted seeking care and an additional 2.5% sought care without admitting it. This latter group reinforces the notion that self-identification as “psychologically distressed” remains stigmatized, at least among some groups, and emphasizes the fact that some people who seek assistance disguise their need for psychological assistance, while others probably fail to seek assistance for similar reasons. These findings suggest that while “upsetness” is common following moderate earthquakes in the United States, this upsetness does not result in diagnosable mental illness. As noted above, the factors responsible for the apparent differences between the current study and those conducted by other investigators must be identified.

Knowledge and Use of Health Services—In general, health services were not heavily used after a moderately sized earthquake in California, and health services made specifically available after the earthquake were least likely to be used. Certainly one explanation of the low use of services reflects low actual need for services. The rejection of health services specifically made available for earthquake-related problems after the earthquake appears to reflect two things. First, people apparently rejected services that may have been perceived to be “public” in favor of “private” services. But, in addition, low use of hospitals, LA County Health Department resources, and community clinics appears to reflect low knowledge of their availability. Lack of knowledge is particularly pronounced among those who might be assumed to be in greatest need of these services, namely linguistically isolated immigrants with low educations who resided in areas of Los Angeles County that experienced substantial shaking, damage, and dislocation. Although, in general, people who were more exposed to the earthquake and, thus, probably had more need for services, were more likely to know about the services that existed, at the same time, need for services or the potential for exposure to their availability, clearly varied with the extent to which a person could be assumed to be disenfranchised or marginalized. In general, immigrants with less than a high school education and those who were linguistically isolated and did not speak English were less likely to know about services than were the highly educated, English-speaking non-immigrants.

It appears, then, that while hospitals and the County Health Department were partially successful in overcoming traditional barriers (e.g., language, access) to care and successfully provided services to at least some of those in greatest need, further attention must be paid to this issue by medical and public health groups involved in disaster response and recovery.

To the extent that immigrants, linguistically isolated and less educated residents knew about the County Health

Department, it suggests that the Health Department was effective in providing services to those for whom their aid was particularly important. To the extent, however, that knowledge did not differ with exposure to the earthquake, it suggests that people in the highly affected areas who needed services may not have gotten them because they did not know about their availability.

Conclusion

The extent to which disasters cause psychological distress and the magnitude of the distress that results has been greatly exaggerated. While some people experience transient anxiety and emotional distress after an earthquake, the occurrence of such events does not result in the development of PTSD and other diagnosable psychological conditions. Recently, the psychological community has tended to exaggerate the extent to which disasters cause serious mental health problems. The services made available after a disaster need to reflect what really happens. Those most in need of supportive psychological services may well be the persons responding to the disaster, rather than the general population. Often, police and fire, public health nurses, building inspectors, and many other service providers are in the field for days or even weeks with few, if any, breaks. These are the people that need to be provided with assistance, starting with periods away from the “action scene”, rest, food and water but also, possibly, including debriefing sessions and emotional support.

In general, utilization of health services in this study was low, and people did not use the public services that were available to them. Part of the low utilization is explained by lack of need for services, but an additional issue is the fact that many people do not know about the available services. The public health and medical communities need to consider how to better match the services provided with needs for services, and to better disseminate information about the availability of these services.

Some people disguised their need for psychological services after the Northridge earthquake. Also, disenfranchised persons—immigrants with less education who were linguistically isolated—knew less about the services that were available, even if they were in a highly exposed area. As with regular health care, efforts to provide services to those with few resources but high need, must be improved.

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