RESEARCH

Access to Health Services and Care-seeking Behaviors After the 2007 Ica Earthquake in Peru

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ABSTRACT

Objective: To assess care-seeking behaviors, perceptions of quality, and access to health services among populations affected by the 2007 Peruvian earthquake.

Methods: A stratified cluster survey design was used to allow for comparison between urban, periurban, and rural populations of the 4 provinces most affected by the earthquake. Forty-two clusters of 16 households (n = 672) were interviewed approximately 6 months after the earthquake.

Results: Of all of the respondents, 38% reported that a household member sought medical care within 2 weeks after the earthquake. Earthquake-related injury, presence of a chronic medical condition, and residence in temporary housing were significantly associated with care seeking in adjusted models. Individuals experiencing earthquake-related injuries and those with chronic medical conditions, respectively, were 7.1 times (95% confidence interval [CI] 3.7–13.7) and 1.9 times (95% CI 1.3–2.9) more likely to seek medical care; temporary housing residents were 1.7 times (95% CI 1.0–2.8) more likely to seek care than those residing in permanent housing.

Conclusions: Earthquake-related injury and chronic medical conditions were associated with care seeking in the first 2 weeks after the 2007 Ica earthquake. Households living in temporary housing were more likely to seek medical care than those residing in permanent structures, suggesting that displaced people are more likely to need medical attention. (*Disaster Med Public Health Preparedness.* 2009;3:97–103)

Key Words: earthquake, disasters, Peru, health care access, health seeking behavior

Postdisaster research has demonstrated that both access to care and health care–seeking behavior are affected by natural disasters.[1,2] Natural disaster effects on health systems include damage to infrastructure, loss of staff and human resources, and logistical challenges to service provision such as lack of utilities, transportation limitations, and difficulties procuring medications, medical equipment, and supplies. Households and communities often experience substantial losses, which may affect their ability to seek care and their prioritization of health needs. Postdisaster changes in care-seeking behaviors and access to health services also may result from displacement, changes in living conditions, and outbreaks of communicable diseases.[3,4] There is a large body of research that explores day-to-day health service use at the population level; however, there is a dearth of studies assessing these issues in the postdisaster context. Most disaster-related health services research focuses on high-income countries or mental health services use; studies of postdisaster health service use and access in less developed countries are relatively uncommon.[5–8]

The Andersen Behavioral Model of Health Services Use, which was developed in the 1960s, is an applicable paradigm for assessing predictors of postdisaster health service use.[9] The model focuses on predisposing characteristics (demographics, social structure, and health beliefs), enabling resources (from a personal, family, and community perspective), the external environment, and the perceived and evaluated need for medical care. Past assessments have examined indicators of socioeconomic status—such as home ownership, income, reliance on assistance, and living conditions—as predictors of health care access.[10,11] Other factors that have been modeled for predicting receipt of assistance (health care or otherwise) are willingness to ask for aid, help-seeking beliefs and comfort, health insurance, and the size and nature of social networks.[10,12] The physical environment—including geographic and natural barriers, land distribution, and transportation systems—also must be considered when exploring health care access, particularly in the postdisaster context in which infrastructure damage may be significant. This study applies the Anderson model to assess care-seeking behavior following the 2007 Ica earthquake in Peru.

On August 15, 2007, at 6:34 PM, a magnitude 7.9 earthquake struck off the southwest coast of Peru. Initial Peruvian government estimates reported 519 deaths and 1300 people injured; the provinces of Cañete, Chincha, Ica, and Pisco were the most affected.[13] Approximately 40 to 50 camps were established for the estimated 58,000 displaced households in the affected regions.[14,15] A list of health facilities in the 4 affected provinces surveyed was compiled by investigators and comprised 167 health facilities, including 11 hospitals. Reports of damage to the health system varied across sources. Preliminary government reports indicated that 103 health facilities were damaged and 14 were destroyed, with the hardest hit city of Pisco losing 90% of hospital capacity.[13] The United Nations Consolidated Appeal reported 4 destroyed and 16 damaged hospitals.[15] A third report by the Pan American Health Organization found 2 hospitals destroyed, 5 damaged or partially destroyed, and an additional 25 government health clinics damaged in the 3 most affected provinces of Chincha, Ica, and Pisco.[16] Damage to health facilities, coupled with road blockages and lack of transportation, adversely affected the ability of health care facilities to provide services as well as population access to care following the earthquake.[15,17] This study explores access to health services and care-seeking behaviors in the 6 months following the 2007 Ica earthquake.

METHODS

A survey of populations affected by the 2007 Ica earthquake was conducted in January 2008 to characterize earthquake impact, unmet health needs, access to health services, and barriers to care seeking following the disaster. The study area included the 4 most affected provinces of Ica, Pisco, Chincha, and Cañete with an estimated population of 747,864.[18] A stratified cluster survey design with random spatial sampling was used to allow for comparison between urban, periurban, and rural residence areas, where varied outcomes were anticipated as a result of differing building practices and access to health services and humanitarian assistance.

Care-seeking data were collected as a component of a larger survey that aimed to quantify the impact of the earthquake on the affected population in terms of injury and displacement. The sample size was determined based on power needed to detect a 20% difference in displacement rates between population groups with 80% power and $\alpha = 0.05$, and was also sufficient to detect a 20% difference in care-seeking rates. The sample size was doubled to compensate for losses in efficiency from the cluster sample design, resulting in a minimum sample size of 660 households, with 220 households per residence area.

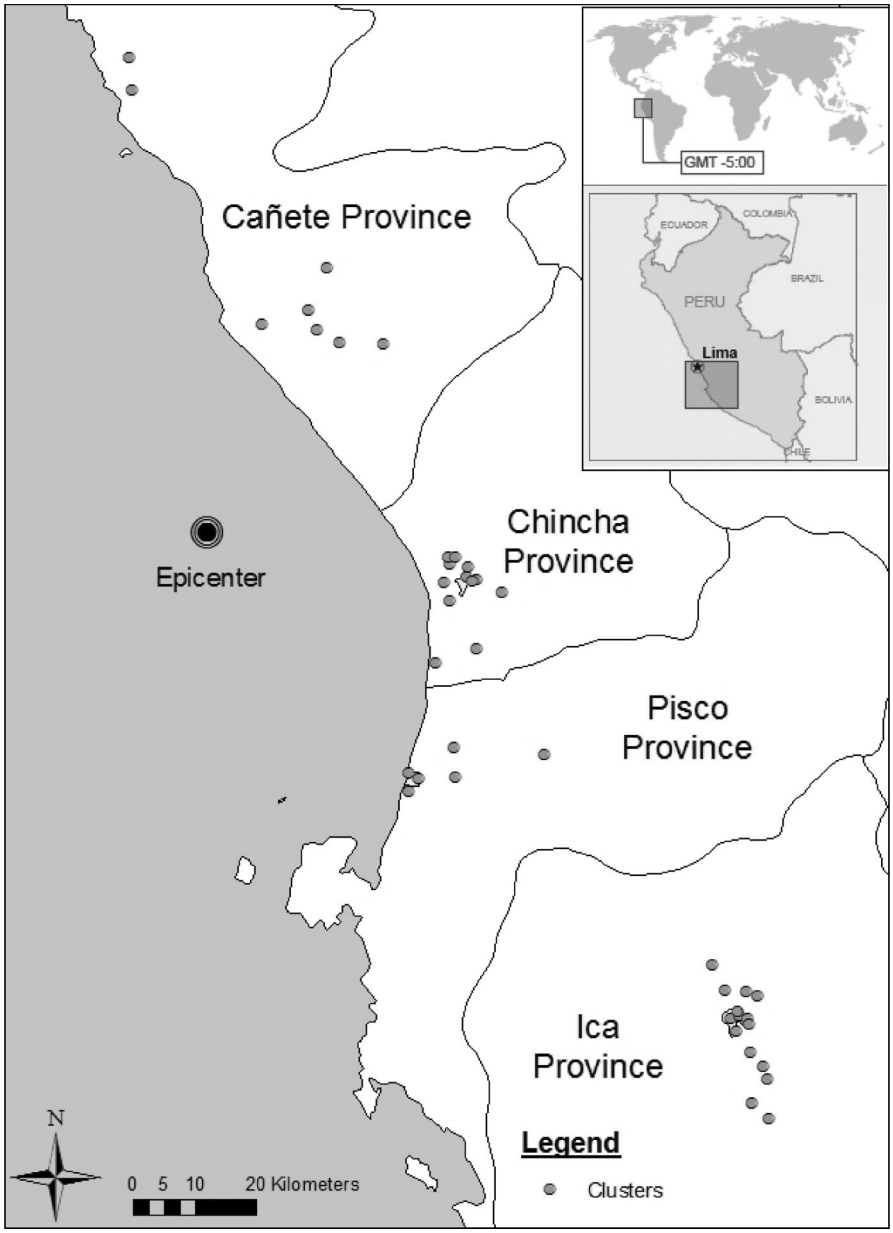
To increase geographic coverage and reduce design effect, a greater number of smaller clusters were preferred; the sample was divided into 42 clusters of 16 households yielding a final sample of 672 households. Urban and rural areas were allocated 28 and 14 clusters, respectively; half of the urban clusters were assigned to formal urban settlements and half to informal periurban areas. After stratification by residence area, clusters were allocated proportionally to population size at provincial and district levels using data from the 2005 Peruvian census.[18] Within each district, random spatial sampling was then used to determine cluster start points; if the start point did not fall within a residential area, then the nearest settlement of the specified type (urban, periurban, rural) was selected for inclusion. Figure 1 displays the geographical distribution of the cluster sites in the 4 affected provinces. Once at the identified start location, random directions were chosen to initiate the survey in each cluster; interviewers approached each home in the assigned direction and asked an adult household member whether they would be willing to participate in the survey. Those who expressed interest were read a study information sheet, and those who agreed were subsequently interviewed. If no adult household member was present, the neighboring home was visited (replacement sampling). Supervisors were present at each cluster site to ensure that the appropriate homes were selected and that questionnaires were completed adequately; interviews were approximately 20 to 30 minutes in length.

The survey instrument focused on earthquake effects such as injury and displacement; household and individual risk factors, including measures of housing quality and socioeconomic status, demographic data, and health status; health services use and unmet health needs; and current living conditions. Housing quality was defined by index measure based on construction materials and access to basic services. Both chronic medical conditions and earthquake-related injury were self-reported by the respondents. Need for health services was reported by household members and was subjectively defined because of concerns that adhering to an investigator-defined definition of need would inaccurately characterize responses and result in misclassification. Chronic conditions included those in which patients regularly took medication for the illness or in which routine health visits were required. Earthquake-related injury was defined as an injury that occurred during or immediately after the earthquake and that was severe enough that medical attention was desired; additional information on injury type, care seeking, and outcome were collected and used for verification. The survey instrument was developed in English, translated into Spanish, and piloted and finalized with the assistance of the local interviewer team. All of the interviewers had at least a high school diploma, and they received 2 full days of training on the questionnaire and basic interview techniques before implementation.

Data analyses were performed using Stata version 9 (StataCorp, College Station, TX). Differences in household characteristics by care seeking within 2 weeks following the earthquake were examined using t tests and chi-square methods; covariates significant at $P < 0.05$ were retained for inclusion in the regression model. Random effects logistic regression was used so that clustering was accounted for in odds ratio estimates for care seeking within 2 weeks following the earthquake.

FIGURE 1

Cluster sites for household survey in the 4 most affected provinces of Peru



The study was certified as exempt by the Johns Hopkins Bloomberg School of Public Health Committee on Human Research and was approved by the Peruvian Ministry of Health.

RESULTS

A total of 672 households participated in the 4-province survey, with 38% of households in Ica, 14% in Pisco, 29% in Chincha, and 19% in Cañete. The stratified sample yielded relatively even proportions of households in formal urban areas (38%), informal periurban areas (31%), and rural areas (31%); the higher proportion of formal urban respondents was the result of reclassification of a periurban cluster. Respondents ranged from 16 to 89 years old with a median age of 45, and 49% of the respondents were male. On average, respondents had 9.4 years of education, and 45% had completed secondary school. Chronic illness was reported in 44% of formal urban households, 32% of periurban households, and 24% of rural households ($P = 0.029$). Earthquake-related injury was reported by 2.6% (95% confidence interval [CI] 1.3–3.9) of the study population; no significant difference in injury was observed by residence area ($P = 0.126$).

Care Seeking Within 2 Weeks Following the Earthquake

Among surveyed households, 38% (95% CI 35–42) of 1 or more household members sought medical care within 2 weeks following the earthquake. Median distance traveled was 3 km; however, mean travel distance was substantially greater at 26.2 km (standard deviation [SD] 68); the mean postearthquake wait time for care seeking was 5 days (SD 5). The majority of care seekers (52%) received care at government health facilities, followed by Peruvian nongovernmental organizations (22%), foreign assistance organizations (21%), and private clinics (5%). Among care-seeking households, 20% (95% CI 15–25) paid for treatment received, with mean and median expenditures of US $37 (95% CI 21–53) and US $11, respectively. (Expenditures were reported in Peruvian soles and converted to US dollars at an exchange rate of 2.83 soles/USD.) Health expenditures represented 16% and 5%, respectively, of reported mean and median postearthquake household income.

Household characteristics by care-seeking behavior within 2 weeks following the earthquake are presented in Table 1. Unemployment was more prevalent among households that sought care (55%) as compared with those that did not seek care (44%) ($P = 0.010$). Households that sought care were significantly more likely to have received humanitarian assistance, with 70% reporting receipt of assistance as compared with 60% among households that did not seek care ($P = 0.007$). Both the presence of a chronic condition and earthquake-related injury were associated with health care seeking within 2 weeks following the earthquake: 35% of care-seeking households reported a member with a chronic illness as compared with 21% of households that did not seek care ($P < 0.001$). Postearthquake housing conditions also varied significantly by care-seeking behavior, with 70% of care seekers reporting residence in permanent housing as compared with 80% of non–care seekers ($P = 0.009$). Current housing conditions were seen as a proxy for displacement in which the majority of those rendered homeless by the earthquake had yet to receive transitional housing and were living in tents and other types of temporary shelters.

Results of univariate and multivariate logistic regression analyses for predictors of care seeking within the 2 weeks following the earthquake are presented in Table 2. Chronic medical conditions and earthquake-related injuries were both significantly associated with care seeking in unadjusted models. After controlling for unemployment, assistance received, current housing type, and province of residence, the associations remained significant (odds ratio [OR] 1.9, 95% CI 1.3–2.9 and OR 7.1, 95% CI 3.7–13.7, respectively). In the adjusted model, households living in temporary housing were 1.7 times (95% CI 1.0–2.8) times more likely to seek care than those living in permanent housing. Province was significantly associated with care seeking in univariate models; however, the relation was attenuated in the adjusted model, which accounted for injury and other proxies of degree of earthquake effect such as postearthquake housing type (a proxy for displacement). Figure 2 illustrates rates of injury, displacement, and care seeking by province within 2 weeks following the earthquake; trends in care seeking closely mirrored injury rates.

TABLE 1

Characteristics by Care-seeking Behavior Within 2 Weeks Following the Earthquake

	Sought Care (N = 256)	Did Not Seek Care (N = 410)	*P*
Predisposing characteristics			
HH head male	79%	79%	0.958
HH head education			
None	4%	3%	0.728
Primary	32%	31%	
Secondary	44%	46%	
Higher education	20%	21%	
Unemployed household member(s)	55%	44%	**0.010**
Economically active HH members before EQ, mean (SD)	1.7 (1.2)	1.7 (1.1)	0.575
Enabling resources			
HH income pre-EQ in soles, mean (SD)	885 (696)	873 (742)	0.588
Income change post-EQ in soles, mean (SD)	−66 (346)	−10 (266)	0.334
Assistance received	70%	60%	**0.007**
Type of assistance received			
Food	63%	57%	0.121
Medical	16%	9%	**0.009**
Other	20%	14%	**0.045**
Current housing type			
Permanent	70%	79%	**0.009**
Temporary	19%	14%	
Other	11%	7%	
Housing condition score, mean (SD)	4.3 (1.6)	4.5 (1.5)	0.435
HH size (No. individuals), mean (SD)	5.4 (2.6)	4.1 (2.6)	0.600
Dependency ratio, mean (SD)*	3.6 (1.9)	3.4 (1.9)	0.215
At least preschool–age child in HH	47%	43%	0.332
Displaced	27%	26%	0.894
Need			
Chronic condition	35%	21%	**<0.001**
Injury	23%	4%	**<0.001**
External environment			
Province			
Cañete	12%	24%	**0.001**
Ica	41%	36%	
Pisco	18%	12%	
Chincha	29%	28%	
Distance from epicenter in km, mean (SD)	75 (35)	72 (36)	0.319
Residence area			
Urban	39%	37%	0.671
Periurban	32%	31%	
Rural	29%	32%	

EQ, earthquake; HH, household; SD, standard deviation.

*Total number of household members divided by the number of economically active household members.

TABLE 2

Predictors of Care-seeking Behavior Within 2 Weeks Following the Earthquake

	Unadjusted Models		Multivariate Model	
	OR	95% CI	OR	95% CI
Unemployed household member(s)	1.5	1.0–2.0	1.2	0.9–1.8
Assistance received	1.5	1.1–2.2	1.3	0.9–1.9
Current housing type				
Permanent	1.0	—	1.0	—
Temporary	1.5	0.9–2.3	1.7	1.0–2.8
Other	2.0	1.1–3.5	1.9	1.0–3.4
Chronic condition	2.1	1.4–3.0	1.9	1.3–2.9
Injury	7.1	4.0–12.9	7.1	3.7–13.7
Province				
Cañete	1.0	—	1.0	—
Ica	2.3	1.3–3.9	2.1	1.2–3.6
Pisco	2.9	1.5–5.4	1.9	1.0–3.2
Chincha	2.0	1.2–3.5	1.8	1.0–3.2

CI, confidence interval; OR, odds ratio.

Care Seeking Within 6 Months Following the Earthquake

One or more household members sought care within 6 months following the earthquake in 58% (95% CI 54–62) of households. Households sought care an average of 2.5 times (SD 4.7) in this period, with mean and median health care expenditures reported at US $82 (95% CI 62–102) and US $25, respectively. In the 6 months following the earthquake, households reporting member(s) with chronic illness averaged more health care visits than those with no chronic illness (3.3 and 2.2, respectively; $P = 0.008$) and higher health care expenditures (US $76 and $44, respectively; $P = 0.020$). Among those with chronic illness, 46% (95% CI 38–53) indicated that care for the chronic illness was disrupted due to the earthquake. Households reporting earthquake-related injuries averaged 4.1 health care visits as compared with 2.2 visits among households with no injuries reported ($P = 0.002$). No statistically significant difference in health care expenditures was observed when households with and without injuries were compared ($P = 0.369$).

Health Service Perceptions and Barriers to Care in the 6 Months Following the Earthquake

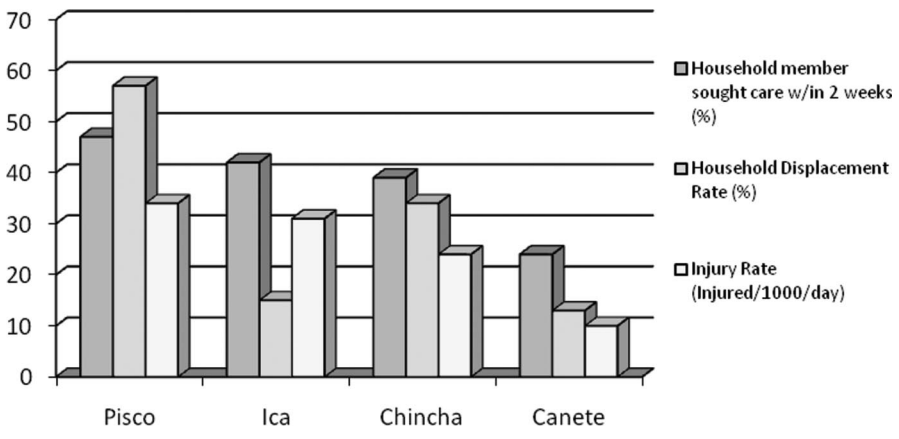
Of households, 74% (95% CI 71–78) reported that access to health care was the same or better than before the earthquake, and 72% (95% CI 68–75) reported that the quality of care was the same or improved. No significant differences in changes of access to and quality of care were observed between households that did and did not seek care in the 6-month postearthquake period ($P = 0.143$ and $P = 0.152$, respectively). More than one-quarter (28%, 95% CI 25–32) of households reported a member in need of medical attention but who did not seek care within the 6-month postearthquake period. Cost was reported as the primary reason for not seeking care by 53% (95% CI 45–60) of respondents, followed by poor quality of care (13%, 95% CI 8–18), inconvenient hours of operation (11%, 95% CI 6–16), lack of transportation (7%, 95% CI 3–10), and inadequate medications or services (3%, 95% CI 1–6). Of individuals who did not seek needed medical care, 31% (95% CI 23–38) reported that their health problems were a direct result of the earthquake.

DISCUSSION

The strongest predictors of health care seeking within the 2 weeks following the 2007 Ica earthquake in Peru were earthquake-related injury and the presence of a chronic illness. Postearthquake housing type and province were also associated with increased odds of care seeking immediately following the earthquake, which is not unanticipated because impact varied across the provinces. Findings support Anderson's model of care-seeking behavior, which illustrates that need is

FIGURE 2

Care-seeking, displacement, and injury rates among surveyed households by province



a primary predictor of care seeking.[9] Findings also suggest that enabling resources, including receipt of humanitarian assistance and housing type, and measures of external environment such as province are associated with care seeking.

After the earthquake, the Peruvian government required all hospitals to provide free services to populations living in affected areas.[16] It is unclear whether all services were available free of cost at the time of the assessment; however, that 20% of households seeking care within 6 months of the earthquake paid for care suggests that free health service coverage was far from universal. Among the 28% of households that reported members who needed but did not seek care (in the 6 months following the earthquake), cost was cited as the reason for not seeking care among more than half of respondents. A parallel survey of 40 public health facilities in the 4-province study area found that 12% (95% CI 2–22) of health care providers reported that cost was a barrier to care seeking in the postearthquake period.[18a]

Research has demonstrated that the health of individuals with chronic conditions can decline following a natural disaster.[19] In the aftermath of disasters in more developed settings, securing medication has been shown to be a primary health need among individuals with chronic medical conditions.[19–21] In the present study, chronic medical conditions were associated with increased rates of care seeking. Unfortunately, reasons for care seeking among those with chronic conditions were not explored in this study; however, that 46% of respondents reported that care for conditions was disrupted in the 6 months following the earthquake is an important finding. A study of individuals with chronic conditions affected by Hurricane Katrina found that treatment was reduced or stopped in 21% of patients as a result of the disaster.[21] As the global population progresses through demographic and epidemiological transitions, the proportion of disaster-affected populations with chronic health conditions will continue to increase. Traditional humanitarian response strategies have focused on immediate primary health needs; however, greater attention to supporting the health needs of populations with chronic health conditions is needed in future disasters in both developed and less developed countries alike.

Approximately three-quarters of study participants reported that access to and quality of health services had either remained the same or improved in the 6 months following the earthquake. In the aforementioned 2007 Peruvian earthquake health facility assessment, 55% (95% CI 39–71) of health providers reported no change in health service quality and 83% (95% CI 55–91) reported no change in access to health services in the 6 months following the earthquake (Chapin et al, manuscript in preparation, 2009). Other postdisaster studies have found that most health care seekers were satisfied with the care they received immediately following the disaster, and that satisfaction with health services deteriorated over time.[21] The majority of survey respondents reported that access to and quality of health services were maintained in the months following the 2007 Ica earthquake, and this finding is supported by a parallel survey of health care providers. Together, these findings suggest that the Peruvian health system was relatively successful in coping with significant damage to health system infrastructure and that adequate health services were provided to affected populations in the 6 months following the earthquake.

There are several limitations that may have influenced study findings and conclusions. First, respondents may have been biased and either under- or overreported their responses because of the belief that assistance was associated with the survey. Second, the survey was conducted 6 months after the earthquake, which could have resulted in recall bias for events and care seeking immediately following the disaster. Third, the stratified design resulted in oversampling of the rural population, and sampling weights for residence areas cannot be calculated because the population proportion in informal periurban areas is unknown; as a result, findings cannot be adjusted and thus have limited generalizability to the entire population of the survey area. This is a significant limitation; however, no significant differences in (non)care-seeking rates were observed by the residence areas, suggesting that survey population results may in fact be relatively similar to the experience of the entire earthquake-affected population.

CONCLUSIONS

Earthquake-related injury and the presence of a chronic condition were the strongest predictors of care seeking in the 2 weeks after the 2007 Ica earthquake. Households residing in temporary housing were more likely to seek care than those in permanent housing, suggesting that displacement and adverse changes in living conditions are associated with increased need for medical attention. Given resource limitations, infrastructure damage, and the disruption of basic utilities and services, the Peruvian health care system coped relatively well in the aftermath of the 2007 Ica earthquake. However, that almost 30% of households that needed medical attention did not access care due to cost suggests that challenges accessing health services were faced by the affected population.

Modeling access to health services and care-seeking behaviors following disasters can aid in planning and prioritizing of humanitarian assistance as well as longer term health system recovery efforts. This is especially true in less developed countries, where few studies have examined predictors of care seeking in the aftermath of disasters. Additional postdisaster research is needed to further the understanding of care-seeking determinants in disaster-affected populations, as well as to document contributing factors to (un)successful health system responses. Findings from future studies could contribute to improvements in response planning and allocation of humanitarian assistance and other resources. With the increasing frequency of natural disasters and the growing size of populations that they affect, understanding determinants of

health care seeking is an increasingly important component for planning and implementing efficient and targeted health system responses.

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Authors' Disclosures

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