

## **Earthquakes in El Salvador: a descriptive study of health concerns in a rural community and the clinical implications – part II**

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### **Abstract:**

Results reported in Part I of the Earthquakes in El Salvador series (see Disaster Management & Response 2003;1:105-9) indicated clinically relevant findings. The findings indicated a need for greater public health action within all five categories reviewed: healthcare, access to healthcare, housing, food, water and sanitation. Significant results between urban and rural communities indicated a need for broader community aid, public health and sanitation services to rural areas. Faster and more efficient disaster management and care services throughout the San Sebastian community were also necessary modifications.

**Keywords:** El Salvador | community health | health impact of earthquakes

### **Article:**

#### **Introduction**

As Part II of the Earthquakes in El Salvador Descriptive Study Series, the health concerns of people living in a Salvadoran rural community after major earthquakes were evaluated. Part I reviewed the background, methods, and results of post earthquake conditions and this article will address the implications of these results and recommendations for improvements within the community.

#### **Discussion**

Demographics of earthquake victims

The initial demographic analysis allowed the researchers to look at the existing health conditions in and immediately around San Sebastian and how those characteristics had an impact on the health and resiliency of the people of the community.

*Age considerations*

The workforce that is available to perform disaster relief is smaller if a large percentage of the population is children, the elderly, and the ill. This health assessment revealed a younger population.

### *Extended families*

The relationships between household members revealed interesting properties as to how family is valued in the community. In both the urban and rural portions of the community, a large percentage of extended family lived with immediate family members.<sup>1</sup> This demonstrated strong family relationships across generations that produced a support system that can be called on in the event of a disaster. It also influenced the number of family members living in a home and the incidence of overcrowding found in the results. The large son-and-daughter population also confirmed national trends of a younger population. The Pan American Health Organization reported that for every 100 working Salvadorans, there are 72 persons who depend on them.<sup>2</sup>

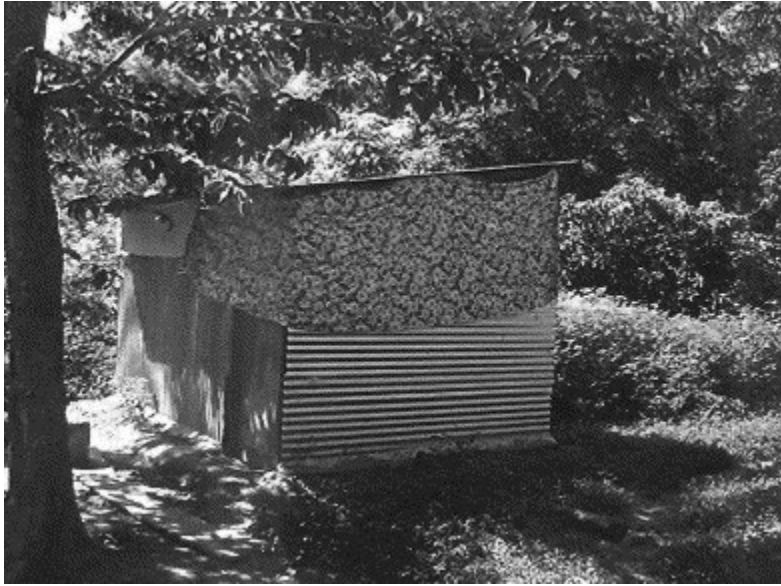
### Increased need for health care

An increase in communicable disease infections was found. However, the change could be related to many variables besides the earthquakes. Gastrointestinal and respiratory infections were common in this population even before the earthquakes. In 2001, 5.5 million Salvadorans lived in malaria areas, parasitic intestinal diseases were the second-leading cause of morbidity, diarrheal diseases rose to 2972 per 100,000 people, and positive results of sputum tests for tuberculosis were 67.3 per 100,000.<sup>2</sup> Acute respiratory infections and pneumonia also were 2 of the leading causes of morbidity among communicable diseases.<sup>2</sup> These pre-existing trends influenced the exacerbating effects that the earthquakes had on communicable disease infection.<sup>3</sup>

A significant portion of the population believed that their households needed health care after the earthquakes. However, a less obvious change in access to care was reported. Differences in ability to manage chronic illness between the rural and urban portions of the population were statistically significant. Rural participants living outside the town of San Sebastian were 14.6% less likely to manage their chronic illness after the earthquakes than were urban residents ( $X^2 = 4.8$ ,  $dF = 1$ ,  $p = .014$ ). In this situation, the effects of the earthquakes may have exacerbated existing problems with access to care and poverty level. A greater inability to manage chronic illness could be a reflection of the longer distances to health care facilities, increased poverty, and inability to seek treatment among the farm area sample group.

### Sources of aid

After the earthquakes, the community was the primary source of aid to victims. In the United States, larger national and world aid groups often are available after a natural disaster. San Sebastian is a rural community, and access to resources is scarce. The majority of respondents reported receiving some form of aid after the earthquakes, such as descriptive reports of rice and beans, a *champa* (metal slab hut) (see Figure 1), or 600 *colones* (the equivalent of \$93 [US]). Whether recipients received the aid they needed is questionable. Many respondents reported needing other supplies, such as fresh water, fruits and vegetables, and medical care. Aid was delayed due to problems with access to the area.<sup>4</sup>



**Figure 1.** *Champa* or metal slab temporary home.

#### Access to aid

After the earthquakes, the Pan American Highway was blocked by a large landslide, forcing traffic to take small unpaved and cobbled roads to deliver health care, aid, and supplies.<sup>5</sup> Because the highway is one of the few paved roads available to get supplies from San Salvador to San Vicente (the closest city to San Sebastian), the community of San Sebastian was the sole provider of initial disaster relief efforts and supplies. Conditions did not improve until other roads could be paved to reach the population; the landslide over the main highway was removed many months later.

Larger communication and transportation means were blocked. Within the *municipio* of San Sebastian there is a government clinic, *Unidad de Salud*, and a Red Cross clinic to provide medical care. The closest hospital is in the city of San Vicente. It is a 126-bed hospital that serves an area with more than 50,000 people.<sup>6</sup> Mobilizing resources to rural areas presents another barrier to health care and aid after a disaster.

#### Housing conditions

Surprisingly, a similar number of family members made up households before and after the earthquakes. Families frequently reported that a cousin or relative was staying with them for 3 weeks until other related family members could house that relative. The number of rooms in a home also remained unchanged. The large number of respondents who reported using a form of temporary housing, or a *champa*, after the earthquakes could have influenced this number. Many respondents counted the *champa* as a new room in their homes, although it was an independent structure. After the earthquakes, an average of 5.9 persons lived in 1.94 rooms in a home. *Champas* were the largest form of temporary housing reported (Figure 1). Metal slab huts have many health risks, giving rise to their nickname—*champa*, or microwave. During the day, the *champas* have decreased air ventilation that quickly can lead to overheating and health

problems. They are commonly used by large numbers of people for sleeping, which can lead to overcrowding and the spread of communicable diseases.

Many respondents reported staying in their own homes, even if they were partially damaged, unstable structures and could be in danger of falling. Makeshift sheet ceilings or the addition of a *champa* commonly were used when adapting to housing damage and to make homes habitable again.

### Safe water supply

Water source, storage, and quality are important factors in preventing the spread of diarrheal disease, parasitic infections, typhoid fever, and cholera. Although a large percentage of inhabitants stated that they used some form of purification system, the study coordinators found that the purification system noted actually was *Puriagua*, a chemical that prevents mosquitoes from reproducing in standing water. It does not act as a purifying agent.



**Figure 2.** Common rural latrine.

Water purity becomes a concern when a grounded latrine is mainly used for human waste disposal. Any efforts made to prevent contamination of wastes into the water supply were not specified. Whereas 57% of urban residents of El Salvador have access to a public, connected sewage system, in rural areas 56% of the population depend on latrines<sup>2</sup> (Figure 2). No indication of the distance between the grounded latrines and the water supply; the soil at the site of the latrine; and the presence of ground, surface water, depth of the grounded latrine, or other environmental health guidelines to prevent contamination were made.

## Sanitation

### *Human waste*

Improper elimination of human wastes can contaminate soil and drinking water sources and act as a breeding area for mosquitoes and flies to feed and transmit infection.<sup>7</sup> Natural disasters can lead to overcrowding in households and put a strain on clean water resources. Plumbing in the town also was a skewed variable. Households that have plumbing reported that their water supply would be turned on 1 to 2 days of the week, depending on the area water supply. After the earthquakes, the Pan American Health Organization reported that the national water supply system, especially storage tanks in the pumping plants of some sectors of San Salvador and central, western, and eastern regions, were damaged.<sup>8,9</sup>

### *Garbage removal*

The garbage removal system of the town also presented a potential source of infection. The use of plastic storage containers within the community was low along with the number of trash collection services provided by the community. The rural community reported a significantly lower amount of trash collection services than did the urban community. The rural community has less access to resources. Study participants reported that a trash collector would arrive at the home, sound a bell, and leave if the bag of trash was not produced. The trash collector would not pick up bags left on the ground. A large percentage of both urban and rural respondents noted leaving their trash on the ground outside their homes for long periods. The wastes could lead to contamination of food that is sold in an outdoor market on the same streets or could be a source of runoff into the water system the same way that human wastes from latrines could act as a source of contamination.

### *Vermin*

The presence of vermin in the home was a major concern. Rodents (rats or mice) have been a public health concern because they act as carriers for infections that can be transmitted to human beings. Mosquitoes and other insects also can act as carriers for infections, such as dengue fever.

A large percentage of households did not find an increase in rodents. This was not surprising because rodents do not reproduce during the rainy season (May to September) and do not thrive on the disruption a disaster brings to their environment.<sup>7</sup> Mosquitoes frequently reproduce during the rainy season and can act as vectors. The increased number of insect and mosquito reports also could have been affected by the natural seasonal changes of the areas. However, earthquake-

related aberrations such as the presence of pooling water, leftover food or garbage, or abnormal sanitation conditions could increase the number of insects inside or near homes.<sup>7</sup>

## **Recommendations**

### Strengthening local rural health care response

These study results show there is a need for change in general health care conditions and disaster preparedness by local rural organizations. International support extended to El Salvador proved to be minimal for rural areas. There were barriers in transportation, access, and communication with the rest of El Salvador and the world. These factors place more responsibility on the local community groups and health organizations after a disaster. The local providers must be able to do immediate assessments, conduct a short-term survey, and provide initial primary care needs.

Providing disaster aid can be less of a burden if providers are given continuing health education and assistance with practices that improve overall health conditions and access to care. Community leaders must take on this initiative, and community members must be made aware of health concerns within their community and their ability to change those conditions. For example, the local Red Cross and the *Unidad de Salud* can sponsor continuing education programs, such as health fairs, on market days. The fairs would provide sustainable learning opportunities that would keep health concerns on the minds of community members.

### The role of nursing students without borders (NSWB)

The members of the NSWB El Salvador initiative have several challenges. They will develop their role as health educators and promoters in the community. They also must build a partnership between local health groups and act as a resource for health and community action education. Health promotion is an essential element of public health work, which needs long-term investment within a community. NSWB must define its involvement after the disasters and make sure that a common plan for responsibility and action is established between the group and community leaders.

## **Clinical relevance**

On returning to El Salvador in January 2002 and July 2002, NSWB members met with Red Cross members and local town leaders to discuss the results of the study, as described in the following:

1. Red Cross members agreed to conduct *Ferias de Salud* (health fairs) every other month to raise awareness of health concerns from the study and change sanitation, food preparation, and waste disposal guidelines.
2. Red Cross members agreed to meet with town leaders to discuss study results and solutions to larger community health concerns and disaster preparedness, such as paved roads and better trash collection practices.

3. Red Cross members agreed to continue to prepare for future disasters through frequent trips to rural areas around the town to assess health care needs and plan for communication and transportation of supplies to rural areas in the event of a disaster.
4. A second nutritional assessment of diet within the community and growth and development of children was conducted with the support of NSWB to assess the effects of the disaster and available food in and around the town on a regular basis.

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