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Natural disaster management: experience of an academic institution after a 7.8 magnitude earthquake in Ecuador

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ABSTRACT

Objectives: This case study describes the implementation of an academic institution's disaster management plan.
Study design: Case study.
Methods: USFQ's Medical School developed a six-phase disaster relief plan consisting of: induction, establishing a base camp, crisis management and mental health aid, creation of multidisciplinary teams and multi-agency teams, and reconstruction. Each phase uses a community-oriented approach to foster survivor autonomy and recovery.
Results: Our methodology facilitated the successful implementation of multidisciplinary interventions to manage the earthquake's aftermath on the personal, community and regional levels, treated and prevented psychological and physical morbidity among survivors and promoted healthy living conditions and independence.
Conclusions: A multidisciplinary response team that addresses medical needs, mental health, education, food, nutrition and sanitation is highly effective in contributing to timely, effective relief efforts. The short- and long-term solutions we describe could be applicable to other academic centres' interventions in future disaster scenarios around the world.

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Background

On April 16, 2016, Ecuador suffered a 7.8 magnitude earthquake; the epicentre was located approximately 17 km from the coastal towns of Pedernales and Muisne. It killed about 700 people, injured 30,000 and completely destroyed towns like Pedernales. Ecuador declared a nation-wide state of emergency, deploying military personnel and other professionals to aid in the search, rescue and relief operations.

In recent years, several natural disasters have occurred throughout the world including earthquakes in Japan, Nepal, Haiti and China, Cyclone Nargis in Myanmar and Typhoon Haiyan in the Philippines, which altogether have affected over 1 million people. The economic, social, political and health care-related aftermath of these natural disasters will remain a global and local burden for years to come.[1–3]

In the face of Ecuador's massive tragedy, several governmental and private institutions began contributing to disaster relief. Our institution, Universidad San Francisco de Quito's Medical School (USFQ), developed a sustainable, long-term disaster response and management plan to support Pedernales and its surrounding rural fishing communities. The first team arrived to the field approximately 3 days after the earthquake. Between April 2016 and September 2016, about 9 teams travelled to the disaster zone.

The goal of this case study is to describe a disaster management strategy used during the first month post-earthquake in the Pedernales area from the perspective of an academic institution.

Pedernales before the earthquake

Pedernales, a rural town located on the northern coast of the province of Manabí, had about 55,128 residents and an area of 1461 km^2. The primary sources of income in Pedernales were tourism, animal husbandry, agriculture, fishing and shrimp breeding.[4] Homes in rural areas were built with sugar cane or wood, whereas in the urban areas they were brick and cement. Unsurprisingly, this rural area had poor health infrastructure even before the disaster; before the earthquake, the major causes of morbidity in the outpatient setting included pharyngitis, intestinal parasites, disorders of the urogenital system, tonsillitis, diarrhoea and malnutrition. The most common causes for inpatient admissions were acute appendicitis, acute cholecystitis and labour.

Pedernales after the earthquake

After the earthquake, most of urban Pedernales was destroyed; during the immediate aftermath, deaths in the Pedernales-area accounted for more than 50% of fatalities in all of Ecuador. Initially, rural Pedernales was not as badly affected, but the area's fragile health care system eventually allowed many co-morbidities to flourish. Thus, medical management in both rural and urban areas included acute illnesses and injuries related to the earthquake as well as chronic conditions that were exacerbated by the post-earthquake conditions. Table 1 shows the total population that was evaluated by our response teams and brigades.

Development of a disaster relief plan

The multidisciplinary, six-phase disaster relief plan developed by USFQ's School of Medicine mobilized local efforts to attend to the affected population's basic needs, supported community development and fulfilled the major gaps in humanitarian aid that we observed during the early phases of the disaster (Fig. 1). Just as any disaster response plan should, our intervention was developed according to evidence-based recommendations to achieve minimum living standards related to water supplies, sanitation and hygiene, food security and nutrition, shelter, settlement, non-food items and health action, as described by The Sphere Project.[5] Our model is unique in that it embraces autonomy, shared decision-making and community involvement to avoid a paternalistic response model that creates dependency.

The goal of the **Induction Phase** was to develop expertise in disaster response strategies before entering and on arriving to the disaster zone. The key activities of this phase included studying evidence-based disaster management strategies as well as contacting medical doctors and disaster relief experts from Nepal, Pakistan and Haiti to solicit assistance and advice. During this phase, we also organized a meeting in the USFQ Medical School approximately 24 h after the earthquake to train faculty and third, fourth and fifth year medical students in disaster management. These seminars continued throughout our intervention and were tailored to each current phase.

Our protocol for training the field response teams required that we begin by defining each team's objectives in advance. The goal of the first response team was to provide crisis management, offer first aid in mental health and map the affected zones to (1) define the current needs of the population to efficiently provide relief, (2) determine the worst affected areas to concentrate our efforts and (3) provide mental health aid in response to the high incidence of cases of depression, stress, anxiety, somatization and other acute co-morbidities that surfaced after the event.

After articulating our objectives, each relief brigade received an introduction to the current field activities, updated vaccinations (tetanus, etc), and so forth and an ID to be worn in a visible location at all times (name, ID number, blood type, allergies and emergency contact information). When our first teams arrived to the disaster zone two days after the earthquake, the initial phase of body recovery, survivor rescue, debris removal and disposal of corpses was already underway and being directed by the government. During each brigade's four days in the field, a designated team leader at the disaster area coordinated actions with local community leaders, governmental agencies, humanitarian organizations and other volunteers to ensure that our work was structured, incorporated smoothly into the current system and valuable to overall recovery efforts.

Our protocol provided adequate support of the Disaster Response Brigades. Although the field leader was primarily responsible for brigade members' safety, the team was supported at all times by the USFQ Medical School's Disaster Response Committee, which supervised all of the university's brigades and related initiatives, managed donations and