# Post-Tsunami Medical Care: Health Problems Encountered in the International Committee of the Red Cross Hospital in Banda Aceh, Indonesia

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**Addendum**

Established in 1863, the International Committee of the Red Cross (ICRC) is the origin of the International Red Cross and Red Crescent Movement. The ICRC is an impartial, neutral, and independent organization whose exclusively humanitarian mission is to protect the lives and dignity of the victims of war and internal violence, and to provide them with assistance.

The ICRC directs and coordinates the international relief activities conducted by the Movement in situations of conflict, or natural disasters in conflict-afflicted countries. It attempts to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles.

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**Abbreviations:**
CD = casualty department
ICRC = International Committee of the Red Cross
OPD = out-patient department
PTSD = post-traumatic stress disorder
WHO = World Health Organization

## Abstract

**Introduction:** When the Tsunami struck Asia on 26 December 2004, Aceh, Indonesia suffered more damage than did any other region. After the Tsunami, many humanitarian organizations provided aid in Aceh. For example, the International Committee of the Red Cross (ICRC), along with the Indonesian and Norwegian Red Cross opened a field hospital in Banda Aceh on 16 January 2005. This study describes the illnesses seen in the out-patient department/casualty department (OPD/CD) of the ICRC hospital nine weeks after the Tsunami. It describes the percentage of people seen for problems directly related to the Tsunami, and includes a basic screening for depression and post-traumatic stress disorder (PTSD).

**Methods:** A prospective, five-day study was performed from 01–05 March 2005. Patients registering in the ICRC field hospital in Banda Aceh were considered for the study. Data collected included: (1) age; (2) gender; (3) diagnosis in the OPD/CD; and (4) whether or not the problem was related directly to the Tsunami. Seven basic questions were asked to screen for depression and PTSD symptoms.

**Results:** Twelve percent of the problems seen in the OPD/CD nine weeks after the Tsunami still were related directly to the Tsunami. Sixty-three percent of patients in the study were male. The medical problems included: (1) urological (19%); (2) digestive (16%); (3) respiratory (12%); and (4) musculoskeletal (12%). Although <2% of patients were diagnosed with a mental health problem, 24% had at least four or more of the seven depression/PTSD symptoms addressed in the study.

**Conclusions:** Post-earthquake and post-tsunami health problems and medical needs differ from those found in conflict zones. After the Tsunami, both surgical and primary healthcare teams were needed. Many problems were chronic medical problems, which may be indicative of the lack of healthcare infrastructure before the Tsunami. The findings suggest that mental health issues must be taken into consideration for future planning. The ethical issues of performing research in complex emergencies also need further development at the international level.

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## Introduction

Hundreds of thousands of people died after the Asian Tsunami struck on 26 December 2004. Many people still are missing and presumed dead. One of the hardest hit areas was the Aceh province in Sumatra, Indonesia (Figure 1). According to the early International Committee of the Red Cross (ICRC) situation reports, 80% of the health centers on the west coast, and 35% of

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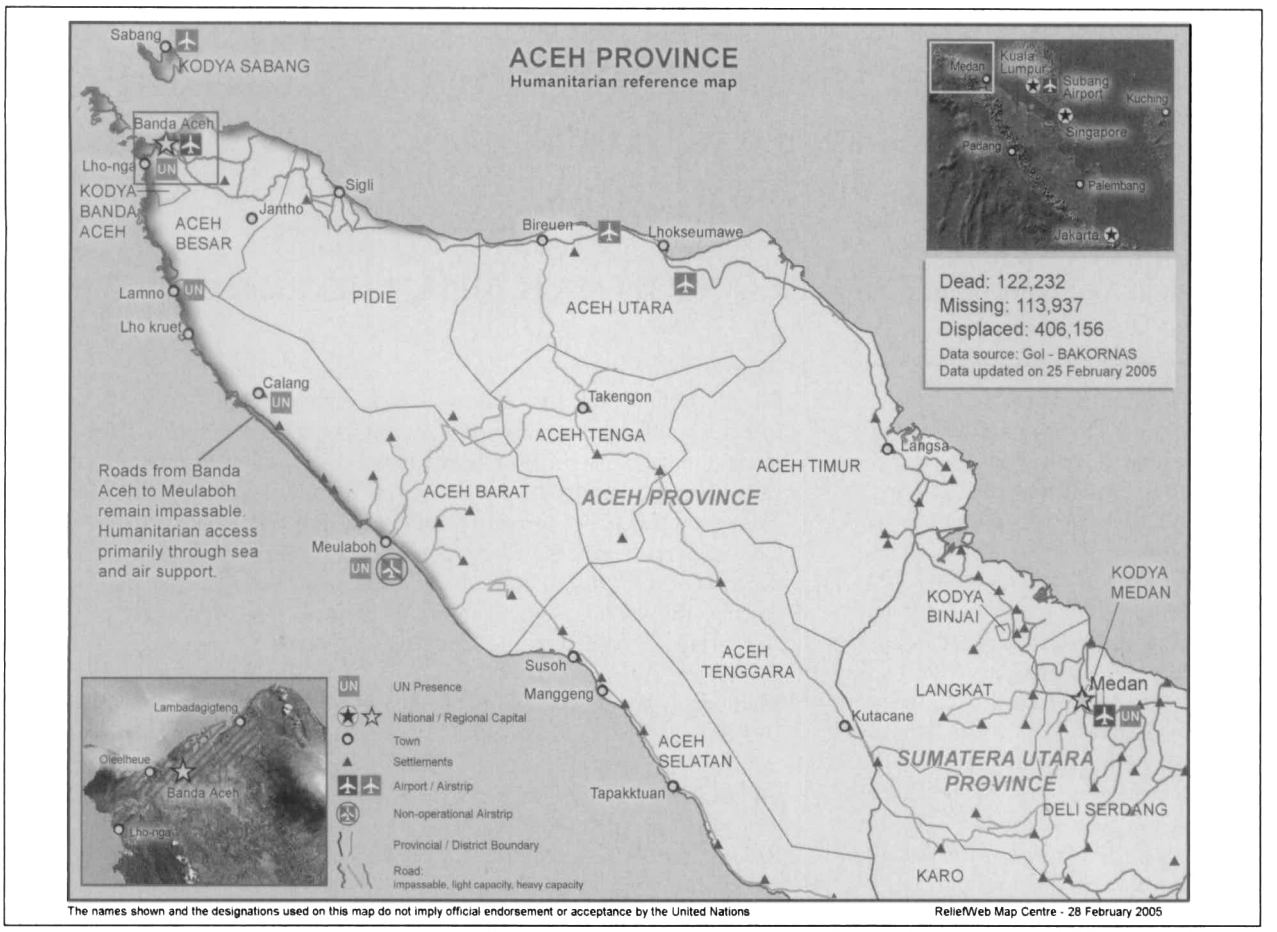




**Figure 1**—Map of Aceh, Indonesia (Relief Web)

health centers on the east coast of Aceh, Indonesia were destroyed. The largest city affected by the Tsunami was Banda Aceh, where the estimated pre-Tsunami population was 500,000 persons. Three of six health centers in the city were destroyed completely, and the others were rendered non-functional. The largest hospital in Banda Aceh, the Zainoel Abidin Teaching Hospital, was flooded with mud and became non-functional. It was cleaned, and currently is open, but with reduced capacity. Prior to the Tsunami, few expatriate workers were allowed within Aceh province, but after the Tsunami, >250 humanitarian organizations were reported to have been working there.[1] The Norwegian Red Cross, together with the Indonesian and ICRC Red Cross, opened a field hospital in Banda Aceh, Indonesia on 16 January 2005. With the cooperation of authorities, the hospital was transferred to the ICRC and the Indonesian Red Cross. This valuable cooperation provided support from Indonesian doctors, nurses, and midwives. The 100-bed hospital functioned as a referral hospital, and provided surgical, obstetrical, medical, pediatric, and in-patient care. On a fully functioning day, the average out-patient department/casualty department (OPD/CD) registered 120–140 patients.

After a crisis like the Asian Tsunami, humanitarian organizations, governments, and other stakeholders attempt to determine the immediate and long-term health needs of the affected population. Three phases of such crises have been described. These phases include: (1) the acute emergency phase (0–1 month after the sudden-onset event); (2) the late emergency phase (1–6 months after the event) and; (3) the post-emergency phase (>6 months after the event).[2] Post-earthquake and post-tsunami health problems and medical needs differ from those found in conflict zones. Literature about the ongoing primary care needs during the late emergency phase after a devastating tsunami is limited. This study describes the out-patients and emergency patients evaluated in the ICRC hospital in Banda Aceh, Indonesia nine weeks after the Tsunami, and the proportion of health problems encountered that were related directly to the Tsunami. It also describes the number of the patients who developed depression/post-traumatic stress disorder (PTSD) symptoms. This information could help direct the allocation of appropriate resources and facilitate the anticipated, targeted interventions in the field.

## Methods

All patients registering at the OPD/CD at the Banda Aceh ICRC hospital from 01–05 March 2005 were considered for the study. Data were collected prospectively, participation was voluntary, and ethics approval was obtained retrospectively from the McMaster University Ethics Research Board in Hamilton, Ontario, Canada. Consent for inclusion in the study was requested to the adult patient or to the parent/guardian of a child <18 years of age. Two children were unaccompanied, so they were not included.



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| AGE (umur) | | |
|---|---|---|
| Gender (jenis kelamin) | Male (pria) | Female (wanita) |
| Diagnosis (diagnosa) | | |
| Admission (daftar masuk) | Yes (ya) | No (tidak) |
| Tsunami Related? | Direct (langsung) | Indirect (tidak langsung) Not at all (tidak sama sekali) |
| Symptoms of (bejala-gejalahya) | | |
| Insomnia (tidak bias tidur) | | |
| Worry anxiety (kekhawatiran) | | |
| Difficulty concentrating (susah sulit konsentrasi) | | |
| Crying a lot (selalu menagis) | | |
| Nightmares (mimpi buruk) | | |
| Loss of interest (kehilangan kesukaan pada sesuatu) | | |
| Thinking about the Tsunami (memikirkan tentang Tsunomi) | | |



Table 1—Data collection tool—Banda Aceh. International Committee of the Red Cross and Indonesian Red Cross hospital outpatient/casualty study

Children <10 years of age were excluded from the depression/ PTSD symptom questions. Expatriates also were excluded from the study because any depression/ PTSD symptoms would not have necessarily been related to Tsunami exposure. Each patient received an information sheet about the study. This sheet was translated into the local dialect and read to the patient. The translators were required to participate in a training session before the study began, and committed verbally to confidentiality. After consultation with local team members, it was clear that verbal consent was more appropriate culturally than was written consent. Audiotape was not available, but feedback from the people from Banda Aceh suggested that audiotape also would not have been acceptable. Patients too ill to answer questions in the OPD/CD were asked to participate before their discharge from the hospital.

The only data routinely collected in the OPD/CD before this study were age and gender. Reliable diagnostic information only was available if the patients were admitted or if they had a World Health Organization (WHO)-reportable disease. The patients kept their own OPD/CD

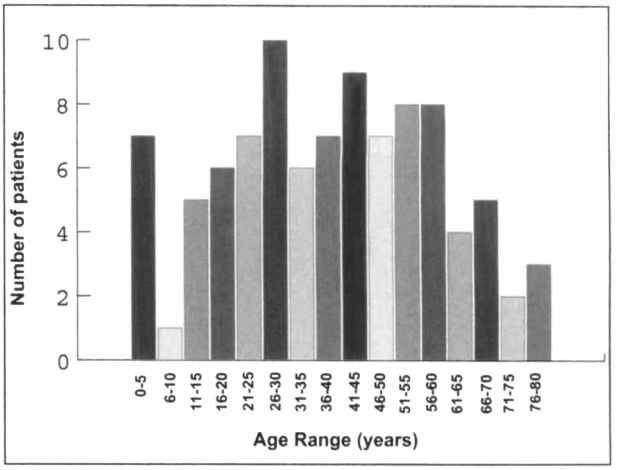




Figure 2—Age distribution of patients seen in the International Committee of the Red Cross outpatient/casualty department in Banda Aceh, Indonesia

charts if they were not admitted, so this information was not accessible at a later date. A data collection tool was developed and used uniformly for each situation (Table 1). This tool was completed by both Indonesian and foreign doctors in English and Bahasa Indonesia (national language). To maintain confidentiality, the data collection tool did not record the name of the patient. The data collection tool incorporated two sections. The first section collected information on age, gender, diagnosis and/or symptoms, as well as an assessment as to whether the problem related directly to the Tsunami. The second part of the collection tool included seven basic questions to screen for depression/PTSD symptoms. These questions addressed: (1) a loss of interest in daily activities; (2) crying; (3) nightmares; (4) thinking of the Tsunami daily (and interfering with daily activities); (5) difficulty concentrating; (6) anxiety symptoms; and (7) insomnia. The data were coded using the WHO International Classification of Primary Care coding diagnostic categories.[3] The analysis was done using the Statistical Program for Social Sciences and Microsoft Excel software (SPSS v13.0, SPSS Inc., Chicago, Illinios; Microsoft Excel 2000, Microsoft Corporation, Redmond, Washington).

## Results

A total of 271 patients were entered into the study. Two unaccompanied children were excluded, and five patients refused to be included. Sixty-four percent of the OPD patients were males. The mean value for the ages was 38 years. Only 16 (6%) were <5 years of age. The median age group was 25–30 years (Figure 2).

Results regarding the frequency and categories of illnesses and symptoms encountered are listed in Table 2. The four most common categories of illnesses/symptoms were: (1) urological (19%); (2) digestive (16%); (3) musculoskeletal (12%); and (4) respiratory (12%). The most prevalent urological categories were bladder/kidney stones (40%), kidney infections (32%), and prostate symptoms (7%) (Figure 3). Digestive symptoms included post-operation follow-up (35%), gastritis/dyspepsia symptoms (31%), diarrhea and gastroenteritis (14%), and abdominal pain



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| Category | Frequency | Percent | Males | Females |
|---|---|---|---|---|
| Urology | 53 | 19.0 | 40 | 8 |
| Digestive | 44 | 15.8 | 29 | 15 |
| Musculoskeletal | 34 | 12.2 | 25 | 8 |
| Respiratory | 33 | 11.8 | 24 | 9 |
| Skin | 30 | 10.8 | 23 | 6 |
| Female system (including pregnancy) | 22 | 7.9 | 0 | 22 |
| Circulatory | 17 | 6.1 | 12 | 3 |
| General and unspecified (inc. infectious diseases) | 22 | 7.9 | 12 | 9 |
| Endocrine | 8 | 2.9 | 5 | 3 |
| Eye | 2 | 0.7 | 1 | 1 |
| Ear | 5 | 1.8 | 2 | 2 |
| Neurological | 1 | 0.4 | 1 | 0 |
| Psychological | 8 | 2.9 | 0 | 8 |
| **Total** | **279** | **100.0** | **174** | **94** |



**Table 2**—Categories of illnesses seen in International Committee of the Red Cross hospital out-patient/casualty department, Banda Aceh, Indonesia.

(12%) (Figure 4). Fifty percent of the musculoskeletal problems comprised fractures and soft tissue wounds, which frequently were infected. The most common fracture type was a femoral fracture, related either to the force of the Tsunami or to motorcycle accidents. Hematoma/contusions (14%), and pain syndromes (11%) accounted for the remainder of the musculoskeletal cases (Figure 5). Respiratory problems predominately were infective (upper and lower tract infections) (46%), and asthma (29%).

The types of infections encountered are listed in Figure 6. The most common types of infections were respiratory (47%), bladder (26%), and skin (11%). There was limited availability to do microbiological cultures. Most cases were diagnosed and treated clinically. The two most common types of tumors seen were breast tumors (20%) and abdominal/pelvic tumors (16%; Figure 7).

Twelve percent of the cases encountered were classified by physicians as being related to the Tsunami directly. Most of these were fractures, wounds, and aspiration pneumonia. Earlier cases also included tetanus. Even at week nine, many patients were seeking medical care for the first time. It is difficult to assess the indirect relationship to the Tsunami, and therefore, this was not measured.

The screening tool used seven basic questions to screen for mental health problems. The screening tool is not a diagnostic tool, and therefore, is not exhaustive. Although there are more detailed screening tools for PTSD, a simple PTSD tool was used in this study. The seven questions addressed: (1) insomnia; (2) worry/anxiety; (3) difficulty concentrating; (4) crying; (5) nightmares; (6) loss of interest in everyday activities; and (7) thinking of the Tsunami daily (and affecting daily activities to cope and function) (Table 1). Of these seven questions, the range of "yes" responses varied from 12–37%. Twelve percent answered

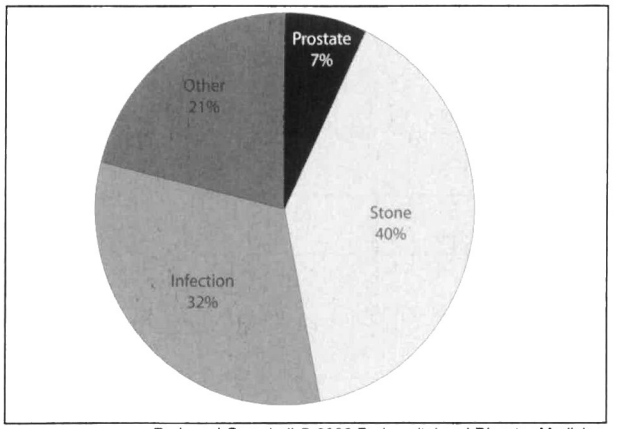




**Figure 3**—Subcategories of urological diseases encountered by the ICRC (n = 53)

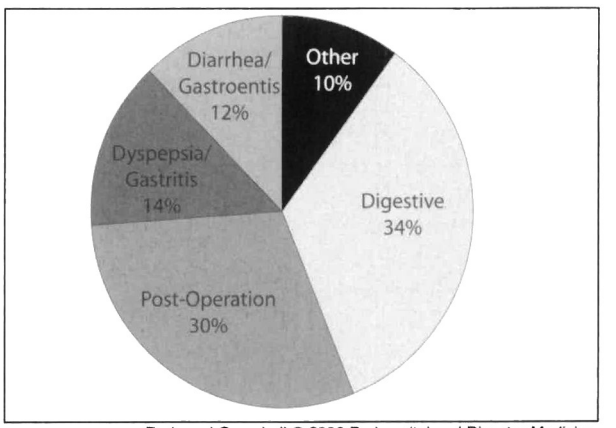




**Figure 4**—Subcategories of digestive problems encountered by the ICRC (n = 44)

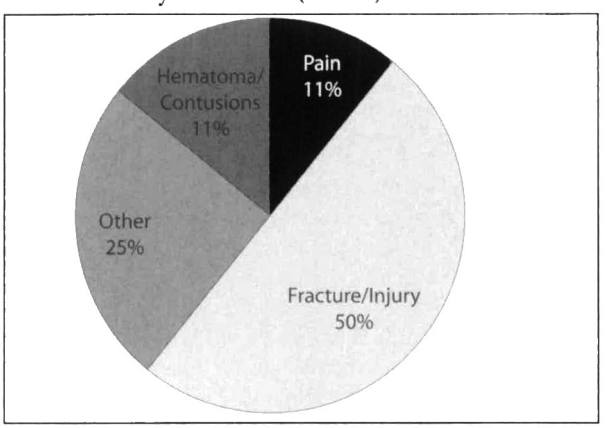




**Figure 5**—Subcategories of musculoskeletal problems encountered by the ICRC (n = 34)

"yes" to crying, and 37% answered "yes" to thinking constantly of the Tsunami (Figure 8). Twenty-four percent of the patients in the study had at least four of the seven depressive/PTSD symptoms addressed.

## Discussion

Since the study only had a duration of five days, the data collected might not be representative of the entire three months of the operation. However, the clinicians working



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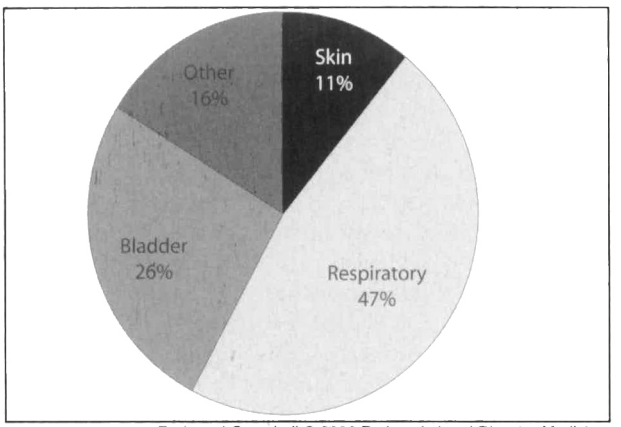




**Figure 6**—Infections encountered by the ICRC (n = 55)

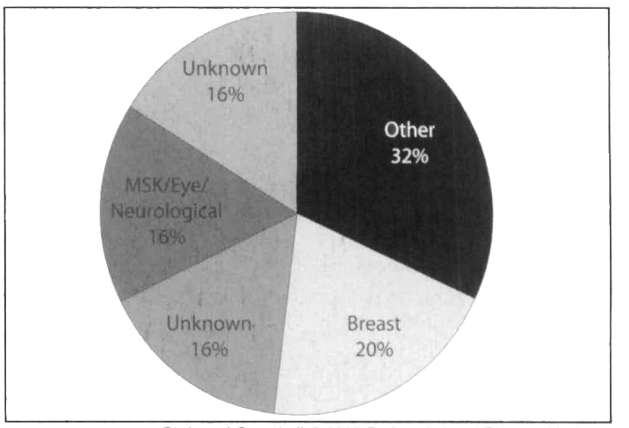




**Figure 7**—Types of tumors encountered by the ICRC (n = 25)

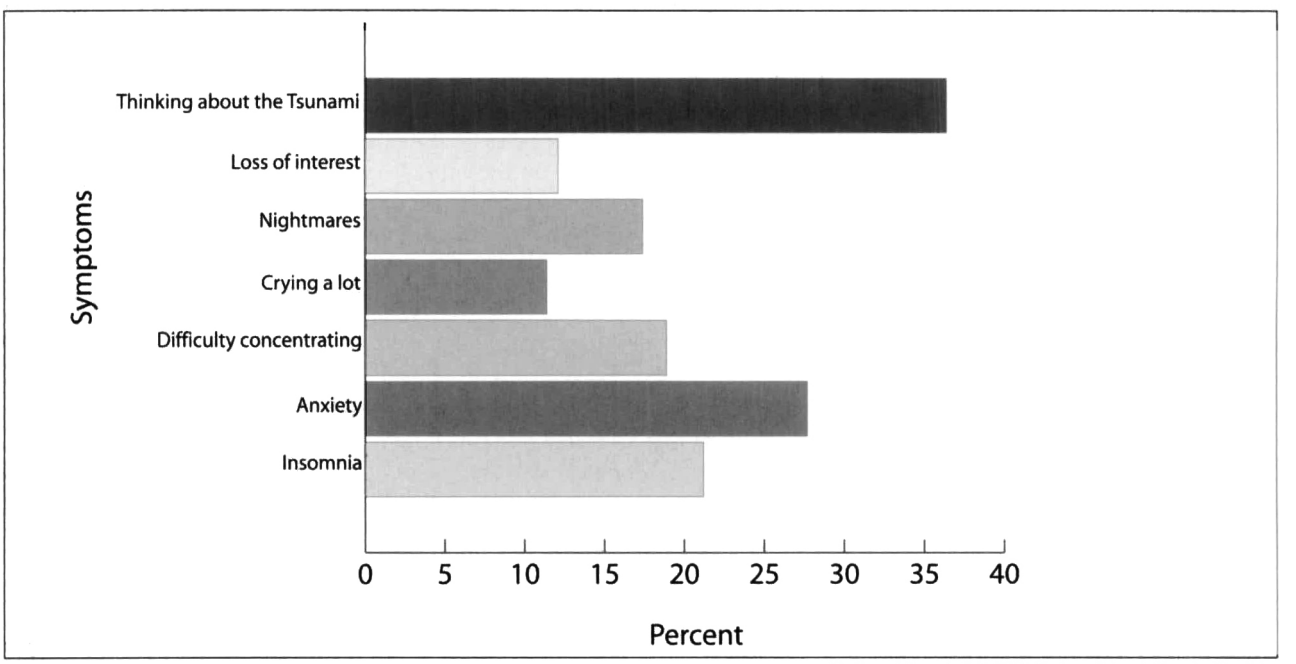




**Figure 8**—Percentage of patients who responded "yes" to each of the seven questions about depression/ post-traumatic stress disorder symptoms

in the OPD/CD agreed the data appear to reflect the types of patients seen. Due to staffing issues during the study, the clinic was fully open each morning, but open only to emergencies in the afternoon. This may have resulted in seeing fewer patients with chronic diseases than if the clinic was open to all patients for the full day. Also, if the OPD had been fully open all day, the sample would have been larger, which would have strengthened the study and the statistical significance of some of the other specific findings.

Twelve percent of the patients seen in the OPD/CD nine weeks after the Tsunami still experienced at least one problem directly related to the Tsunami. It is likely that many more problems were related indirectly to the Tsunami, but these were more difficult to assess. For example, digestive symptoms of gastritis may be indicative of an underlying mental health stressor. Previous studies have demonstrated that, in comparison to control groups, in a post-disaster situation, there is an excess of gastrointestinal symptoms, psychological problems, and medically unexplained physical symptoms.[4] Injuries such as stepping on road debris may be related indirectly to the displacement of people and the presence of debris on the road after the Tsunami. The in-patient hospital data reflected higher rates of cases directly related to the Tsunami.[5] Most likely, this is due to the fact that many Tsunami injuries were severe enough to warrant hospital admission, and the majority of these surgical cases required >1 operation. There were 54 patients who required 103 operations from 16 January to 07 March 2005. All of these injuries were related directly to the Tsunami. Fracture stabilization, repeated wound debridements, and split skin grafts were the most common surgical procedures due to old fractures and severely infected wounds.

In this study, 63% of the patients seen in the OPD/CD were male. Other reports have indicated that women and children were more likely to have died in the Tsunami than were



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men.[6] This difference was less apparent in the more severely devastated areas. This may be one explanation to account for the number of male patients. Also, women may not have had equal access to health care. Only 6% of patients seen in this study were <5 years of age, possibly due to similar reasons.

Due to the nature of the pre-Tsunami political instability in Banda Aceh, it is difficult to obtain pre-Tsunami health data for the region. For various reasons, access to the medical system before the Tsunami was very limited for many people in the region. The Tsunami aggravated the situation, which may explain why the most common categories of illnesses seen in this study were not related directly to the Tsunami.

After the Tsunami, both surgical and primary healthcare teams were needed. Because of the paucity of primary healthcare centers in the region after the Tsunami, the hospital OPD/CD had a large number of primary care visits. This may differ from other disaster situations, during which many primary care facilities have remained operational. Routine post-operation follow-up is one example of how the OPD was used to compensate for the lack of primary care facilities.

There appeared to be a high prevalence of both kidney and bladder stones, which probably predisposed many to the urinary tract infections reported. Respiratory infections accounted for the most common type of infection seen. There have been case reports and anecdotal reports of high incidence of Tsunami-related, post-aspiration pneumonias.[7] The ICRC hospital treated some severe aspiration pneumonias as a result of inhaling mud and debris from the Tsunami. Many patients in the OPD presented with respiratory symptoms even in March 2005 with descriptions of "swallowing the Tsunami water". Some of these patients had had recurrent respiratory symptoms after they stopped taking their oral antibiotics and had to be re-started on antibiotics. Microbiological facilities were limited in Banda Aceh, and often, plain x-ray films and clinical presentation were used to make the presumptive diagnosis. Some cases of tuberculosis also were diagnosed on chest x-ray.

Half of all of the musculoskeletal problems reported were fractures or soft tissue wounds. The fractures related to the Tsunami usually were of the femoral or tibial fractures. Often, these were difficult to treat surgically (reposition and fixate) due to the time elapsed since the initial injury. These types of injuries reflect the magnitude and force of the Tsunami wave when it swept over the coast.

Women's health issues (including pregnancy-related issues) were not in the top five diagnostic categories in this study. Many infants probably were delivered in villages. Only 68% of women in Indonesia have a skilled attendant at birth.[8] These numbers likely are lower in Aceh province. As mentioned, fewer women were assessed in the OPD/CD, contributing to the decreased absolute number of women's health issues seen. Some of the more common tumors seen in the OPD/CD, however, were breast tumors and pelvic/abdominal tumors in women. Many were advanced and may be a reflection of the lack of access to medical care before the Tsunami.

The responses to the depression/PTSD questions generate some interesting hypotheses and discussion. These questions are simple screening questions, and not a comprehensive assessment of depression or PTSD. It is interesting to note that although 24% of OPD patients had at least four of the seven depression/PTSD symptoms addressed by the questionnaire, only two patients (1.4%) were diagnosed with a mental health problem. The culture in Aceh usually does not endorse open displays of emotion and grief, so perhaps doctors were not asking openly about mental health symptoms. However, these results endorse the need for better assessment and cultural/language that are appropriate for planning for mental health in the Tsunami-affected areas. Recent reports have stressed the importance of addressing mental health issues in complex emergencies.[9] In addition, there is a lack of trained mental healthcare workers, particularly in more remote areas such as Banda Aceh, where dozens of counselors and psychiatric nurses died and around 2,000 healthcare workers were left homeless.[10]

Performing research in complex emergencies is an issue that must be addressed. The two biggest challenges in this study were: (1) the lack of an available ethics review board; and (2) the cultural acceptability of verbal but not written consent. There is a lack of evidence for most health interventions in crises. There is constant tension between the need to develop evidence-based, emergency health measures and the need to protect vulnerable populations from possible exploitation or harm.[11] Three categories of studies have been proposed as appropriate during crises. These types of studies include: (1) etiology/prevalence; (2) assessment of operations/systems and; (3) clinical intervention research.[12] Bioethics principles always must be maintained, even if there are no formal research ethics review boards immediately available in these situations. They include informed consent, confidentiality, beneficence, and do no harm. Discussions headed by an international body about the best ways to do ethical research in crises are needed.

## Conclusions

A post-tsunami humanitarian plan should address urgent disaster-related care and basic primary care related to the loss of healthcare infrastructure. Organizations performing humanitarian work must ensure that health teams are diverse enough to provide this care. Research about what is seen in the field is important to the long-term understanding of the natural history of disasters at the emergency, late-emergency, and post-emergency phases. This information is the foundation for developing evidence-based interventions in crises.

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