



Patterns of health service utilization following the Tsunami in Thailand



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ABSTRACT

On the morning of December 26th, 2004, at least 280,000 people lost their lives to the largest Tsunami ever recorded. Relative to other natural disasters, little is known about the patterns of health service utilization following a tsunami. In a prospective cohort study, we described the patterns of health service utilization in four Tsunami-affected provinces (Phuket, Phang Nga, Krabi, and Ranong), one and two years post-Tsunami in Thailand. There were two study groups: 1) tsunami-affected (N=1,035) and 2) unaffected participants (N=854). We interviewed participants on their use of health services (i.e., outpatient services, inpatient services, home visits, medications, and informal care). The pattern of health service use varied for each service examined and at each of the two follow-up periods. Understanding the patterns of health service utilization may inform decision-makers and assist in future planning of post-disaster support. Often, organizations and governments fail to anticipate lasting effects of disasters and prematurely withdraw support services even though affected areas need long-term support.

1. Introduction

On Sunday, December 26th, 2004, at least 280,000 people lost their lives due to a Tsunami [1]. A massive earthquake, measuring 9.0 on the Richter scale, struck the west coast of northern Sumatra Island in Indonesia [1]. The Tsunami directly affected fourteen countries, including six provinces in Southern Thailand, the geographical focus of this study [1]. At least five million people were affected in some way worldwide [1]. The immediate impact was catastrophic; approximately 60,000 people were directly affected in Thailand alone, with 3,980 dead and 6,065 injured [2]. The aftermath of this disaster was perhaps just as devastating as its immediate impact, marked by significant and prolonged economic and health effects [3].

Relative to other natural disasters, little is known about the patterns of health service utilization following a tsunami. Additionally, this type of disaster can create compound disasters and occur without warning. In post-Tsunami Thailand, studies have examined the impacts on the psychosocial outcomes of survivors and health providers, health status, as well as disaster management and response [4–16]. Little is known however about the patterns of health service use following a tsunami, despite there being extensive literature on natural disasters and health

service use particularly in the context of earthquakes and hurricanes. The studies that do exist on the aftermath of earthquakes and hurricanes demonstrate continued use of outpatient services and medications for up to two years by at least 20% of initial users [17–20]. There is also an absence of literature examining the use of inpatient services, home care, and informal care in post-disaster settings.

In 2005, with support from the Canadian Health Services Research Foundation and the Canadian Institutes of Health Research (CHSRF/CIHR), a research study was initiated to examine the impact of the 2004 Tsunami on health service utilization and health status in Thailand. This paper is a part of the larger study in 2005 [15,16,21], and aims to contribute to the literature by outlining the general patterns of health service utilization in Tsunami-affected areas. Specifically, we present data on health service utilization following the Tsunami (overall and by affected status), and we identify commonly used health services in the Tsunami-affected provinces of Thailand.

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2. Methods

2.1. Study population and settings

The study population comprised Thai citizens who were living in one of four study provinces (Phuket; Phang Nga; Krabi; and Ranong) at the time of the tsunami and were 14 years of age or older. This age criterion was based on the age threshold of the Short Form Health Survey (SF-36® Medical Outcomes Trust, 2000). From six affected provinces, two provinces were excluded because the numbers of affected people were significantly lower than the other four provinces. Two groups of participants were recruited: 1) affected individuals, defined as Thai residents who suffered personal injury, loss of home, or loss of business due to the Tsunami; and 2) unaffected persons, individuals who lived in the areas hit by the Tsunami but who did not experience any of the above-mentioned Tsunami-related losses. To focus on the direct Tsunami effect on individuals, we did not include people who were affected by the death, absence, or loss of business by a family member in our sampling frame.

The list of individuals in the affected group was obtained from the Thai Department of Disaster Prevention and Mitigation (DDPM), and the list of unaffected individuals from the Bureau of Registration Administration (BORA). For the affected sample, two-stage sampling included: a random sampling of affected households from the DDPM registry, and random selection of a person within each household, using the Kish¹ procedure [22]. To develop an unaffected sampling frame, the BORA selected 1,000 Thai residents in each province from the provincial household registry using a systematic random sampling method provided by the research team. The affected and unaffected study groups formed two exhaustive and mutually exclusive sampling frames. Participants were randomly selected from the corresponding study groups. The sampling procedure was the same but conducted separately for each study province.

2.2. Data collection

Participants were interviewed face-to-face approximately one year and two years post-Tsunami. The first interview was approximately 60 min in length, and obtained information on demographic variables, socio-economic variables, health outcomes, and health service use. The follow-up interview lasted approximately 20 min and focused only on health status and health service utilization. The interviewers were public health officers who completed a 1-d training program provided by the research team. Written informed consent was obtained from all participants including parental consent from those who were under age 20.

The SF-36® was used to obtain information on individuals' health status, the Ambulatory and Home Care Record (AHCR©Coyte and Guerriere) on health service utilization, and the Demographics Data Form on demographic variables, socio-economic variables, and health outcomes. Instruments were translated into Thai by the research team. They were reviewed by two focus groups of residents in the study regions, and modified by health professionals, to ensure that they were valid and culturally appropriate.

¹ Kish generated a series of eight different selection tables that reflect different designations that a participant was chosen based on different numbers of people in a household. Each table was to be used with a certain proportion of the cases in a sample. Each chosen address received the assigned Kish table. Thus, each chosen affected household had a pre-assigned Kish table to be used as the basis for deciding whom to interview. The Kish respondent selection process is systematic and ensures that all relevant members of the household are identified and may be included in the sample.

2.3. Variables

2.3.1. Health service utilization

The Ambulatory and Home Care Record (AHCR©Coyte and Guerriere, 1998) was used to obtain health service use in the four weeks prior to the interview, one and two years post-Tsunami. Five main and common types of health services in the study setting were examined: 1) outpatient services at any health facility with any health professional; 2) inpatient services (i.e., hospital admission); 3) home visits by any health professional; 4) medications and supplies (which may be obtained without having inpatient or outpatient services); and 5) informal (unpaid) care by anyone. Health service use was a binary (used/not used) variable. The psychometric properties of the AHCR© have been evaluated, and a moderate to almost perfect agreement was found between study participants' responses on the AHCR© and administrative data ($\kappa=0.41-1.00$) [23]. The AHCR© has been previously used in other studies with various populations [24–28].

2.3.2. Affected status

The Tsunami-affected status was categorized into three groups: 1) personal injury only (experienced physical injury from the tsunami), 2) property loss only (lost property and/or business to the tsunami), and 3) both injury and property loss (experienced both 1 and 2). Each affected status was compared to the unaffected group independently. There are many different ways in which a disaster could affect individuals [29]. This study focused on direct personal exposure to the Tsunami.

2.3.3. Baseline characteristics

Information on demographic variables, socio-economic variables, and health outcomes included age, sex, marital status, household size, religious affiliation, education level, employment status, satisfaction level with health services, residing province, health insurance, physical and mental health status, and number of health conditions. Because geo-coding was not available in the study provinces, the research team conducted fieldwork and travelled 14,000 km to collect coordinate data on the location of health facilities and the residence of each participant. Distance between each participant's residence and the registered health facility was calculated using a Network Analyst Extension in ArcGIS 9.3 software (Environmental Systems Research Institute, CA, USA).

2.4. Statistical analysis

Data were analysed using the SAS 9.4 software (Statistical Analysis System, NC, USA). If the reported p-value was ≤ 0.05 , the null hypothesis was rejected. *Student's t-test* and *Pearson's Chi-square tests* were used for continuous variables and categorical variables, respectively, to examine sample characteristics. The patterns of health service utilization between the study groups (affected and unaffected) as well as between one and two years post-Tsunami were determined. Due to the small sample, the analysis between participants with personal injury only ($N=22$) and unaffected participants could not be conducted.

This study received ethical approval from both the University of Toronto, Canada and Chulalongkorn University, Thailand.

3. Results

3.1. Sample characteristics

The total sample size was 1,889 (1,035 affected and 854 unaffected participants), yielding a response rate of 97.2%. Two years after the Tsunami, 1,814 participants (990 affected and 824 unaffected) completed the follow-up interview, thereby yielding a follow-up rate of 96.0%.

Baseline characteristics of the study participants are shown in

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