วารสารวิชาการสาธารณสุข
ปีที่ ๑๗ ฉบับเพิ่มเติม ๕ (พฤษภาคม - มิถุนายน) ๒๕๕๑

Journal of Health Science
Vol. 17 Supplement V (May - June) 2008

Original Article

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Situation Analysis of the Tsunami Diasters Public Health Impacts on National and International Scales

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Abstract On December 26, 2004, an undersea earthquake in the Indian Ocean 330 km off the island of Sumatra in Indonesia, occurred at 07.59 local time. It triggered a series of devastating tsunamis along the coasts of most landmasses bordering the Indian Ocean along the coastal areas in Southeast Asian and South Asian countries namely Indonesia,Thailand,Sri Lanka,India,East Africa,Malasia,Maldives, Myanmar and Bangladesh. Damages caused by the Tsunami disaster: has proved very disastrous and too costly in terms of over 300,000 lives and properties losses. This situation analysis focused on changes and impacts on public health internally and internationally resulting from the tsunami disaster in the 6 provinces. Synthesize lessons learned on public health networking and its operating processes on local, national and international interaction were synthesized leading to recommendations on strategic policy to top-level executives on relief efforts in response to massive casualties.

Data were gathered by a qualitative method conducted from January to May 2005, forty-four case studies with impacts on public health resulting from the tsunami disaster in the 6 provinces were selected and interviewed. They resided in Phuket ,Phang - nga ,Krabi,Ranong,Satun and Trang.

It was narrated that several people drowned near the coasts resulting from an irregular flash flood, irregularly high waves attacking the coasts about 20-30 minutes and there were several deaths and injuries. Most of the patients had wounds all over the bodies or on part of the bodies. The top five types of illness were open wound and laceration of soft tissues down to the muscle on the arms, legs, chests, abdomens, and backs; drowning, mostly dying before reaching the hospital,and pneumonia,mostly resulting from choking of water,mud and sand and almost all being infected; bone fractures of arms,legs,ribs,wrists and angles at one or more parts.

The Health Department also set up Special Operation Center in order to manage vital support for those in need through the process situation analysis of planning to improve and monitor environtmental sanitation that would be risky to health in order not to be affected by communicable diseases and health-threatening conditions. Risk groups in need of mental health supports included 1) victims who lost their families'members, properties and gears and equipment crucial to their livelihood. 2) survived foreigners who returned back to their home countries. 3) children, adolescents and fisherman who were able to escape relalively unharmed get suffering from Post trauma syndrome but were mentally impacted and group of orphan. 4) all professional aid workers. 5) employees who worked in these devastated area and became unemployed, lack of income and supports.

It was concluded that,Thailand still need surveillance and warning system to effectively monitor gigantic wave movement which will provide reliable database for the early warning system. A preparedness plan for a major disaster such as tsunami should be site-specific and developed with strong local participation, particularly on preventive measures. Forensic medicine is generally the weakest link in Thailand due to a limited number of well-qualified personnel. The strength and patience of the forensic teams and volunteers were put to the extreme test. With the international assistance, half of the workload had been done within 3 months. The nation learned about the pains of inadequacy the hard way and fully realized the urgent need of capacity building and networking in order to mobilize resources and technical assistance in time. It is worth noted the most valuable experiences of managing and co-ordinating forensic teams from 29 foreign countries.

Key words: **Tsunami, disaster, public health impact**

Introduction

On December 26, 2004, an undersea earthquake in the Indian Ocean 330 km off the island of Sumatra in Indonesia generated tsunamis which devastated 6 provinces along the Andaman Coast of Thailand, and Coastal areas in other Southeast Asian and South Asian countries: Indonesia, Sri Lanka, India, East Africa, Malaysia, Maldives, Myanmar and Bangladesh. Tsunamis can be generated by several factors: submarine or coastal volcano eruptions, submarine earthquakes, large meteorite impact in the ocean, and man-made activities such as underground explosions that cause imbalances in global geography, climate, and atmosphere. To date, most tsunamis have been triggered by undersea earthquake measuring over seven on the Richter scale. An undersea earthquake with such strength causes rapid water displacement on a massive scale. Waves are formed as the displaced water mass radiates across the ocean at an enormous speed-like gigantic ripples on a pond disturbed by a tossed stone.[1-2]

Damages caused by the Tsunami Disasters: has proved very disastrous and too costly in term of 300,000 lives and properties loses. In Thailand alone, a preliminary assessment of the Earthquake and Tsunami Relief Center reported that 24 districts, covering 83 subdistricts or 333 villages in 6 provinces, namely Phuket, Phang-nga, Krabi, Ranong, Satun, and Trang:were affected. In all, 59,561 people in 14,266 families faced tragic consequences and relocation.

The death toll in Thailand reached 5,395 of which 1,925 were Thais 1,953 foreigners and 1,517 undifferentiables. Forensic experts, could identify only 1,861 bodies (1,470 Thais and 391 foreigners). (However, Claims on the remains by relatives were made on 1,259 Thais and 245 foreign visitors. There remained 2,882 unidentifiable bodies. Among those 8,457 injured, 6,065 of them were Thais and 2,392 foreigners. (However, 3,062 persons remain unaccounted for, of with 2,059 were native and 1,003 non-native.) The tragedy deprived 848 children of their parents and destroyed 6,728 buildings.[3] The disaster also wrecked havoc, measured in terms of financial loss: 8 billion baht in agriculture, 2 billion baht in business. The livelihoods of the affected population along the coastlines of the 6 provinces were jeopardized and a preliminary assessment yielded a loss of 15 billion baht excluding household and human settlements. Other property damages are also to be assessed including, ports, bridges, roads, drainage, dikes, dams, public utilities(electricity, water supply, telephone systems) It should be noted that the impacts on natural resources and environmental quality are yet to be quantified.

The tragedy is supposed to be one of the most critical lessons learned by the nation. False security has long prevailed as the country had neither any experience on tsunami nor was it well organized in such massive casualties and destruction. In spite of the vast mobilization of relief efforts, regarding first aids, medical treatment, referral system, forensic services, management of dead bodies, claims assessment, by public and private sectors alike drawbacks and overlaps involuntarily hampered the efficiency. Preparedness plan is, then required in order to establish guidelines and measures to expedite the relief process while maintaining maximum effectiveness relating to emergency medical services, referral system, public information management and relation, resources and support management system, logistics and supply chains, epidemiologic surveillance and communicable disease control, mental health care/rehabbilitation/follow-up, environmental health, temporary and permanent settlement, sanitary systems (portable water, waste water, refuse and nightsoils) and identification of human remains management. Lessons learned from the tsunami disaster in 6 provinces were to be analysed and its immediate and long term impacts on physical

health, mental health, social conditions, economy and environment were to be scrutinized.[4]

As such, the awareness of the significance of preparedness plan, synthesized from the valuable lessons learned during the disaster, will be a focus of a situation analysis. Analysis on field operations of public private sectors and NGOs in the mobile relief efforts would yield recommendations on pertinent policy adopting, integration and proactive approach in its effective preparedness plan for any forthcoming disaster. Guidances to be developed, thereby, need to be operationable, site specific, efficient and ready.

Methodology

This situation analysis focused on changes and impacts on public health internally and internationally resulting from the tsunami disasters in the 6 provinces. Lessons learned on public health networking and its operating processes on local, national and international interaction were analyzed leading to a synthesis. Strategic policy to top-level executives on relief efforts in response to massive casualties was to be recommended. In order to achieve the objective documentary assessment and qualitative analysis experience through narratives, reflecting interplay between experiences and their contextual circumstances were chosen as methods on gathering detailed data.

Sample Population

Forty-four case studies included 6 Provincial Chief Medical Officers, 5 Directors and Deputy Directors of General Hospitals and 3 Community Hospitals, 3 Heads of Nursing Divisions, 4 Heads of Emergency Rooms, 4 Heads of Operation Rooms, Surgeons, 4 District health officers, 2 staff of public charity foundation, 2 staffers of the Thai Red Cross Society and 3 non governmental organizations, 4 village health volunteers, and 4 people affected with this disaster. Interviews were conducted in Thai and all informants were Thai language speakers. Snowball sampling was also applied to identify additional cases in due process.

Data Collection was conducted from January to May 2005, forty-four case studies had impacts on public health resulting from the tsunami disaster in the 6 provinces were selected and interviewed. They resided in Phuket, Phang-nga, Krabi, Ranong, Satun, and Trang.

Data Analysis

Experiences and lessons learned from the tsunami disaster in the 6 provinces would become essence of data analysis. In a content analysis, experiences and lessons learned was ralated to 7 questions : 1) emergency medical services & responses and referral system 2) communications and public relations 3) human resources & support, medical and food supplies and logistics 4) epidemiological surveillance, disease control and pertinel vaccination 5) immediate mental health care, rehabilitation and follow-up services 6) environmental health, sewerage system, refuse and nightsoils disposal 7) special care for risk groups, children, women, elderly and the handicapped 8) body identification and management.

Results

26 December 2004, A Day of Great Loss[4]

From Sumatra to Andaman.....

07.59 hrs. An Undersea earthquake occurred in the Indian Ocean approximately 580 kilometers off the Andaman Coast.

08.04 hrs. The earthquake alert warning was issued in Indonesia. The tremor is felt in many areas of Thailand.

08.13 hrs. The resulting tsunami hit the shores of Indonesia.

08.30 hrs. A 10-plus-meter-high tsunami struck Bunda Aceh on the northwestern shoreline of Sumatra as well as India's Nicobar Islands located 189 kilo-

meters to the northwest.

09.20 hrs. On the Andaman coast, the sea receded from shore by distances ranging from 100 to as much as 500 meters

09.30 hrs. The Tsunami hit the Andaman coast in Phuket, Phang-nga, Ranong, Krabi, Trang and Satun. The largest wave was reportedly 10 meters high.

Thousands were killed immediately. Damage to property exceeded 10 billion baht.

10.00 hrs. Meteorogical Department Director-General reported an earthquake in Thailand measuring 8.0 on the Richter scale. Several more tsunami hit the shores.

12.30 hrs. Public Health Ministry mobilized over 100 teams of medical officers and rescue workers with ambulances from Surat Thani, Chumporn, Ranong, Nakhon Sithammarat, Trang and Pattalung to provide medical aid to the injured.

Operations for Problem-Solving in Localities

Health administrators (provincial chief medical officers and general hospital directors) in all six Tsunami-affected provinces were primarily informed of the disaster just before 10 A.M. (local time) on Sunday,26 December 2004, or two hours after the earthquake of Sumatra island. The information they received was similar, for example several people were drowned near the coasts or there was an irregular flash flood, irregularly high waves attacking the coasts about 20-30 minutes before being informed and there were several deaths and injuries.

The administrators responded in a similar manner, phoning several information sources to confirm that the disaster of an unusual scale had occurred. They then immediately reported to the provincal governor and to ministerial administrators in Bangkok. At about the same time there were breaking news reports on television about huge waves or Tsunami storming the Andaman coasts of Thailand, resulting in a large number of deaths and injuries and property damages. Telephone systems were congested and down and as a result no telephone communications could be made.

At the provincial level, the governors or acting governor called urgent meetings of all provincial-level chief officers to assess the situation and assign responsibilities in coping with the disaster. In coordination with Red Cross Units and charity foundations/agencies, provincial authorities erected tents as temporary shelters for the victims and provided them with clothes, medicines for preliminary treatment, as well as first aid-kits. Most importantly, all general hospitals were directed to prepare to provide medical services to patients and injured people.

Medical Services

As soon as the disaster was confirmed, all the hospital implemented their mass casualty management plans immediately; without even before any instructions from their superiors. That was because the plans had already specified the operational frame-work for their hospital and within their respective areas of responsibility.

It should be noted that Phuket provinces was where the Andaman Narenthorn Center was located. The center, covering Phuket, Phang-nga and Krabi provinces in case of any public disaster, the emergency services plan would be launched and Andaman Narenthorn Center Phuket promptly informed and coordinated with the Narenthorn EMS center and its network member hospitals.

During the implementation of the emergency medical service plan, in each hospital of which director served as the plan director, service centers/units would be established. As such, an information center would be providing information to other agencies and the public under the supervisions of a deputy director. In addition a logistics unit was to provide medical supplies/equipment as well as food and drinking wa-

ter for patients, relative and staffs while emergency care unit chief , nursing director, emergency chief nurse, operations room chief or ICU chief were assigned to set up a mental health team and an autopsy team.

Number and Characteristics of Injuries and Deaths;

There were not so many injury cases during the first two hours of the disaster; growing numbers of injury cases and deaths soon flooded the hospitals rapidly as more and more were transported from many Tsunami affected areas. Some were referred to other hospitals outside the affected areas yet some stayed in community hospitals and health centers of their own domiciles. As a result, more beds could be made available for seriously injured cases. Some spaces or buildings, such as meeting rooms or hallways, were transformed into inpatient wards or temporary shelters for injured victims who had been treated and waiting for being relocated or taken home by relatives. Regarding medical supplies and equipment, not only the hospitals central supply units, were available, but also additional supplies flowed in from other network member hospitals.

Illness Characteristics of the Patients Treated in Hospitals

Most of the patients had wounds all over the body or on parts of the body. The top five types of illness were open wound and laceration of soft tissues down to the muscles on the arms, legs, chests, abdomens, and backs; drowning, mostly fatal followed by pneumonia, mostly resulting from choking of water, mud and sand and almost all being infected; bone fractures of arms, leg, ribs, wrists and angles. Lacerated wounds mostly had foreign bodies including impacted soil and sand, in some cases such foreign bodies were found in the tissue one-foot or more from the wound openings. Some cases had complications with infections as a result of the severe impact of the foreign bodies. The surgical procedures or debridements performed to take out impacted tissues so as to let the wound heal itself, were difficult and almost impossible. Besides, there were pneumonitis from aspiration of water and dirt during the event. Infections were found differently in each hospital, for example in Vachira Phuket Hospital; culture and sensitivity test mostly found Proteus, Klebsiella and Pseudomonas, those bacteria were sensitive to antibiotics, for example, amikin, augmentin and gentamicin, etc

Roles of Private Sector and NGO's and Foreign Aids

For this disaster, Phuket Red Cross Society allocated donated money to purchase more coffins or wooden boards for making special size of coffins in order to fit in bloating dead bodies of unusual sizes. Every province had to procure clothes or plastic bags with zipper for packing dead bodies waiting for verification of personal identity. Besides those charity agencies and foundations, there were many more Thai and foreigners private agencies contributed in helping victims and mitigating impact on victims. The Krabi Meritime Hotel, Krabi Province provided shelters for wounded foreigners who were treated from hospitals, stranded and at a loss without; passport, I.D. card, including money, property, clothes and personal belongings. More over the hotel provided clothes, foods, bags, socks and shoes and other necessities included money in some cases. The hotel also accommodated temporary offices of many embassies in order to issue documents and facilitate their subjects to travel back home or transferred to Bangkok for further treatment, or additional assistances. Such hospitality were replicated by Thammasat University and many entrepreneurs in due course.

It should be recorded that after the first day

of disaster, there were several mobile teams dispatched by Red Cross Society of many countries, for example, Finland, Hong Kong, France, China, Japan, etc; for humanitarian purposes. Quarter Red Moon Council from Saudi Arabia also sent a number of big size coffins for dead bodies. Japanese Red Cross Society not only sent mobile mitigation team but also provided helicopters with equipment for searching victims around the islands. Besides Red Cross teams, there were also Rescue Team from other agencies of various countries, these teams gradually reaching the devastated area after the third day of the disaster.

Management on Environmental Health, Disaster Surveillance and Control Sanitation and Environmental Health

Health teams of every province had surveyed and preliminarily assessed the situation. Moreover, local technical agencies of technical department which were, Regional Health Center (region 11 and 12) of Health Department located in Nakorn Si Thammarat and Songkhla Province, the same as Regional Diseases Control of Disease Control Department and Psychiatry Center at Surat Thani Province (Saun Saran Rom Hospital) and Songkhla Psychiatry Hospital of Mental Health Department all reached the devastated areas and provided technical advice included managing on fronting health problems. In part of Health Department, supports included experienced technicians from Regional Health Center, and also a set up of Special Operation Center under the guidance of high rank officials and senior technicians to PDCA (Plan-Do-Check-Act) in each affected province. The affected areas preliminarily classified by local problems into 3 categories;

1. areas around temporal shelters
2. areas for autopsy and collecting bodies
3. devastated area.

The teams assessed the condition and planned to improve environmental sanitation condition that would be risky to health and planned to develop, monitor the conditions until these area were not under the threat of communicable diseases and unhygienic conditions. The problems were assessed periodically, as follow;

1. First 48 hours after occurrence

In areas inundated with fatal cases and temporary morgues without cold storage, the places were plagued with foul odour.

In area around tempory shelters had problems of clean water for domestic use, sanitary latrines, garbage and flies control. Water and foods were not problematic and adequately provided by private sector, foundations, Red Cross Society and donors in general.

In devastated area, problems mostly were piles of debris of construction materials, vehicles, and rotten organic matters. Public utilities were destroyed especially water supply systems, electricity; waste water and garbage management.

2. From 48 hour to 1 week after occurence

The stench smell around the temporary morgues became unbearable and inundated with infectious wastes, flies and waste waters.

The temporary shelters still had problems of inadequate sanitary latrines, cleanliness of surrounding areas, quality of water for consumption was deteriorated, more garbage and inadequate disposal systems and unhygienic food sanitation.

Contaminations of water sources became more pronounced in devastated area.

3. Rehabilitation phase, from 1 week on

Areas for temporary morgue still had the same problems especially infectious wastes and waste waters from autopsy but the foul smell was relatively subsided with biological control and deodorants.

In areas around temporary shelters, 5 weeks after disaster, some centers started to face with scarcity of drinking water because of shortage of donated

bottled water, conditions on refuse, wastewaters and food sanitation became even more critical.

Contaminations of water sources in devastated area was still the crucial health problem, whereas local health personnel, special operation team and Health Department team moved in with an attempt to mitigate the problem. The mandate was highly prioritized and carried out by cleaning and disinfection of water wells with chlorination, arrangement of mobile water supply system, eradication of flies and vector insects, provision of health education to victims and concerned people on general sanitation, food sanitation and supporting technical knowledge to local authorities, provision of black bags, garbage containers and set up garbage collection and disposal system, built cesspits with filter beds as temporary waste water treatment , water and food quality surveillance by sampling food and water from various sources and installed septic anaerobic tanks onsite treatment plant in body collection area at Phuket and Krabi Province, also collaboration with Office of FDA and private sector asking for support to install water filtration system for long term use in the temporary shelters.

Disease Surveillance and Disease Control

Thailand had long experience in disease surveillance and disease control especially for infectious disease and had been on the front line among developing coutries for the eradication of crucial communicable diseases in the past, for example, small pox, plague and polio. In the past 10 years, the control of epidemics, acute hemorrhagic fever, leptospirosis or even HIV/AIDS was outstanding. In the last two years, the nation had learned how to cope with newly emerging diseases : Severe Acute Respiratory Syndrome(SARS) and avian influenza, Thailand has built up new generation of health personnel with good experiences in investigation, disease surveillance and disease control covering all over the country. Regarding Tsunami Disaster in 6 Andaman provinces, SRRT of each province was well prepared to operate immediately by reaching the affected area to assess the situation and then set up disease surveillance system, Disease Control Department by Office of Epidemiology and Regional Disease Control Center in localities had sent out support teams to provide technical assistances and advice or manage operation at the site including follow outcomes of operation periodically. Vaccinations were provided to victims and high risk groups particularly those irregular migrant workers and their offsprings.

Management of Offensive Surveillance System

Preliminarily the diseases that required offensive surveillance in these 6 affected provinces were categorized into 5 groups (22 diseases), those were; 1) diarrheal diseases, 2) respiratory tract disease, 3) fever, 4) meningitis, 5) miscellaneous group, e.g.; wound infection, injury and jaundice, etc and had added more diseases that needed surveillance in devastated area.

Mental Support to Victims

The same as responding to the event of physical team, operation teams from Mental Health Crisis Centre (MCC) from local psychological hospitals; Suan Saranrom Hospital, Surat Thani Province and Songkhla Nakarin Psychological Hospital of MOPH; had reached the devastated areas on the first day of the disaster and provided service to the victims both physical primary medical care and mental health problem assessment included primary treatment with medicine, counseling and psychological support to victims who lost their relatives, friends valuables items and properties. The Mental Health Mobile Teams had been set up and mobiled into the affected area of 6 provinces and provided services to the victims everyday continuously for 1 month. The target groups of these teams were:1) injured victims 2). relatives 3.) vic-

tims who lost their houses and properties 4.) local workers

Services provided included mental status assessment, physical and mental therapy; counseling and referring severe or complicated cases to appropriate hospitals. During one month of providing mobile services, collection of technical data was done simultaneously, e.g.; interviewing patients both behavior and emotion by observation using stress test and depression test questionnaire developed previously by the Mental Health Department.

As for long term support for victims who had psychiatric problems, a workshop and meeting among experts from both inside and outside the country, workers from both government and private totalling 150 participants, was held at Department of Mental Health on January 7, 2005. It had classified risk groups who needed supports into 5 major groups. Those were; 1) victims who lost their family members properties and livelihood gears and equipment. 2) survived foreigners who returned back to their home countries. 3) children, adolescents and fisherman children who were able to escape promptly but were mentally affected or became orphans; 4) all professional aid workers. 5) employees who worked in these devastated areas and became unemployed, lack of income and support from government.

As for the mentioned mental health problems, the follow-up plan will include reassessment of the situation and provide appropriate treatment in this target group at least 6 months to 2 years and will focus on Post Traumatic Stress Disorders (PTSD) and Generalized Anxiety Disorder (GAD) or Depression.

Integration on Services

In the first period, mobile health treatment team, health and environmental health team, epidemiological surveillance and disease control team and mental health team had their own operation plans and independently operated in order to manage their problems and high risk factors more efficiently, after the emergency rescue period, all of health teams had been integrated to work more harmoniously in terms of targeting, and field operations.

Procedure on Death Victim Identification

At the beginning, rescue teams and volunteers from all organizations were responsible for searching bodies in the affected areas and brought them to the nearest hospitals. It was later found that all of hospitals could not keep the body for further identification because of inadequate storing capacities, cold storage and lack of manpower. In the following days, more efforts by thousands of soldiers, Police Air Division and volunteers from social foundations of other province had reached out to search for the deaths along the seashore in the deep sea and islands with success. There were also rescue teams from Germany (2 teams, 20-30 persons/teams), Japan (50 persons with 22 physicians and/rescue boat), and a number from Taiwan. In the first week Thailand also used a number of dogs, mobilized heavy machines which could save lives and retrieved many bodies. Thus in the first few days, number of bodies kept coming into tempory morgues at Ta Chutchai Cemetery, Phuket (later moved to Mai Kao Cemetery), at Yan Yao Temple. Bang Muang Temple and Luk Khaon Temple in Ta Kua Pa District, Phangnga Province and autopsy center at Pracha Santisuk Foundation, Krabi Province.

There were also many DVI(Death Victim Identification) teams from Germany, Austria, Hong Kong, Israel, Sweden, South Korea, Japan, etc provided helping hands. Decomposition rapidly set in and they were overwhelmed by the workloads required by thousands of bodies very difficult to verify. Even samples drawn from the bodies for DNA verification induced conflict of ideas in autopsy standard. However after exchanging data and ideas in meetings, DVI teams from

29 countries including DVI team from Thailand finally reached a conclusion to use the same standard, DVI international standard and decided to run autopsy all bodies orderly without any discrimination of races or colors. All of these data of autopsies would be linked to Interpol of each country. It was confirmed that there were 44 races of victims from Tsunami Disaster in Thailand altogether.

In addition to sending rescue teams and DVI teams to Thailand, many countries also extended their services to body presentation and transfer too, Those included refrigerated containers and a number of sealed body bags. After conducting DVI and delivered more than 2,000 bodies to their relatives, many autopsy centers were closed down or combined together in order to provide one stop services.

Management: Lessons Learned and Development of the Mechanism on Prevention and Mitigation in the Future

Regarding to the Tsunami catastrophe, lessons learned were summarized, and focused confusion and actual responses in each period of the incident.The major areas that should be emphasized in coping with the disasters in the future are :

1) Knowledge on Tsunami

Tsunami and other type of disasters had never been recognized in the Thai education curricula from primary to advance education schooling system, while Mogan sea gypsies along Andaman Coast retained this indigenous knowledge. So,Knowledge management on Tsunami as well as other disaster should be thoroughly provided indiscrimately at all level.

2) Communication System

It was learned that in the first hours of event were life-threatening ; the communication system were overwhelmed and absolutely failed. Mobile phones and computers networks were not available, short wave radio were more effective and could help rescueing and co-ordinating in urgent assistance. Newly developed and more reliable and appropriate communication system are crucial.

3) Disaster Preparedness Plan and Regular Drills

Thailand experience showed that mass casualty preparedness plan in each hospital and province can minimize loss in lives and disabilities , but that was not still adequate in dealing with disasters of unimaginable scale like the Tsunami. Integrated and comprehensive preparedness plan and regular drills need to be explored and developed completely. These should include the development of an effective warning system, population assessment and designating, appropriate resettlement areas with logistic supplies and basic amenities.

4) Forensic service and body verification

New production and training for personnel in these areas are crucially needed. Calling for assistance from international agencies and experts might be the most rapid and better way in case of emergency.

5) Environmental management, surveillance and control of diseases

Though Thailand had experiences in developing a vast network and effective surveillance system, but focus was made on infections and communicable disease control. It is time to extend these asset of experiences to the new areas like non-communicable diseases and especially to disasters both natural and man-made.

6) Long term social/psychological impacts

The post traumatic stress disorder (PTSD) is one of the new experiences of Thai people after the deadly

disaster. More knowledge and activities are required with respect to Thai context. As a silver lining, the disaster provides vast opportunities for research and development.

Discussion

The most serious complication leading to mortality of submersion patients was near drowning assocaiated pneumonia, resulting from scoured humus and deposits from ocean beds as reported by Supot Phukaoluan.[11] In that retrospective study, near drowning associated pneumonia accounted for 84.8 percent of patients admitted to Krabi hospital during the tsunami disaster. Critical complications were a case of pulmonary abscess and a case of Acute Respiratory Distress Syndrome-ARDS. Seventy percent of the patients involuntarily ingested mud sand and sea weeds. Pneumonia was related to those with history of liquid intake entering their lungs. Kringsholm B et al.[8] reported that 90 percent of the submersion patients swallowed water and 7-10 percent fatally drowned.

Depressions were commonly reported among the victims and those affected. Santi Kanjasnaniyam[12] studied depressions among the tsunami victims in Amphoe Kapoe, Changwat Ranong and reported 84.80 percent of them were not depressed. As such, it may depict areas with minimal impact. However counselling services provided by the Department of Mental Health in the six provinces showed that the incidence rate increased from 19.7 percent the first week to 26.5 percent in the second week. The trend went negative in the third week and down to 6.8 percent. Somchai Tansirisitthikul,[13] nevertheless, detected stress at a normal level among most of his subjects in Tambon Don Wan, Amphoe Hua Taphan, Changwat Amnat Chareon. Variations in terms of stress and depression is therefore, wittnessed.

Symptoms found among depressed victims were insomnia, depression, unhappiness, sadness, and weight loss. Similarly Amporn Otrakul[14]. also confirmed in their findings of hopelessness (47%), insomnia (44%) and scatten brained (40.5%) among her subjects.

Lessons learned reflect critical impacts on physical and mental health of both local people and tourists environment and ecology. It, hence, underlines an urgent need for reliable and effective warning system. In addition preparedness plan with periodic drills are required focusing on real-time monitoring, prevention plan, evacuation and resettlement plan, treatment, rehabilitation relief, environmental health management plan and surveillance and control of diseases.

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บทคัดย่อ **การวิเคราะห์สถานการณ์ผลกระทบทางสาธารณสุขของมหันตภัยสึนามิในระดับชาติและนานาชาติ**

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สำนักวิชาการสาธารณสุข กระทรวงสาธารณสุข

วารสารวิชาการสาธารณสุข **2551; 17:SV1320-30.**

วันที่ 26 ธันวาคม พ.ศ. 2547 เกิดเหตุการณ์แผ่นดินไหวในมหาสมุทรอินเดีย ห่างจากเกาะสุมาตราของประเทศอินโดนีเซีย ประมาณ 330 กิโลเมตร เมื่อเวลาประมาณ 07.59 น. ตามเวลาท้องถิ่น ก่อให้เกิดความเสียหายตามแนวชายฝั่งของมหาสมุทรอินเดีย เขตพื้นที่เอเชียตะวันออกเฉียงใต้ และกลุ่มประเทศเอเชียใต้ ได้แก่ อินโดนีเซีย ไทย ศรีลังกา อินเดีย แอฟริกาตะวันออก มาเลเซีย มัลดิฟท์ พม่าและบังคลาเทศ ทำให้เกิดความเสียหายอย่างมากมาย ประชาชนมากกว่า 300,000 คน ได้รับความเสียหาย สถานการณ์ครั้งนี้ส่งผลกระทบต่อการสาธารณสุข ทั้งภายในและภายนอกประเทศ กรณีประเทศไทยได้รับผลกระทบ 6 จังหวัด ด้วยเหตุดังกล่าว จึงศึกษาถึงบทเรียน จากเครือข่ายงานสาธารณสุข และกระบวนการปฏิบัติการในระดับพื้นที่ ระดับชาติ และความช่วยเหลือระหว่างประเทศที่จะสังเคราะห์บทเรียนครั้งนี้เพื่อนำไปสู่ข้อเสนอแนะเชิงนโยบายสำหรับผู้บริหารระดับสูงต่อการผลักดันแผนรองรับอุบัติภัย ระเบียบวิธีวิจัยใช้วิธีการเชิงคุณภาพ เก็บข้อมูลในช่วงเดือนมกราคม - พฤษภาคม พ.ศ. 2548 ในพื้นที่ที่ได้รับผลกระทบจากภัยพิบัติครั้งนี้ 6 จังหวัด ได้แก่ ภูเก็ต พังงา กระบี่ ระนอง สตูล และตรัง เก็บข้อมูลในกลุ่มตัวอย่าง ที่ได้รับผลกระทบด้านสาธารณสุขในพื้นที่ จำนวนที่ศึกษา 44 ราย โดยวิธีการสัมภาษณ์เจาะลึก

ผลการศึกษาพบว่ามีผู้ประสบภัยจมน้ำและจมโคลนบริเวณแนวชายฝั่งจากผลคลื่นยักษ์ถล่มบริเวณชายฝั่งเป็นเวลา 20-30 นาที และมีผู้ได้รับบาดเจ็บและตายเป็นจำนวนมาก โดยส่วนใหญ่ผู้ป่วยมีบาดแผลตามร่างกายหลายแห่ง เป็นลักษณะแผลเปิด และแผลฉีกขาดของเนื้อเยื่อ ตามลำตัวแขน ขา อก หน้าท้อง หลัง ทั่วร่างกาย ผู้ป่วยที่จมน้ำจะเสียชีวิตก่อนมาถึงโรงพยาบาล ส่วนผู้ป่วยปอดบวมโดยส่วนใหญ่เกิดจากสำลักน้ำโคลน ทราย และการติดเชื้อ นอกจากนี้พบกระดูกหักบริเวณแขน ขา กระดูกซี่โครง ข้อมือและข้อเท้า การให้ความช่วยเหลือมีการตั้งหน่วยบริการสาธารณสุขเพื่อเป็นศูนย์ปฏิบัติการ การบริหารจัดการให้ความช่วยเหลือตั้งแต่การวางแผน การช่วยชีวิต การจัดการสุขาภิบาลสิ่งแวดล้อม เพื่อป้องกันโรคติดต่อที่อาจส่งผลต่อสุขภาพได้ กลุ่มเสี่ยงต่อปัญหาทางสุขภาพจิตที่ต้องให้การดูแล คือ 1.) เหยื่อในเหตุการณ์ภัยพิบัติที่สูญเสียสมาชิกในครอบครัว และสูญเสียทรัพย์สิน 2.) ชาวต่างชาติที่รอดชีวิตที่ต้องเดินทางกลับประเทศของตน 3.) เด็กกำพร้าที่ครอบครัวเสียชีวิตทุกข์ทรมานเกิดภาวะซึมเศร้า 4.) กลุ่มผู้ให้ความช่วยเหลือผู้ประสบภัย 5.) ลูกจ้างที่ทำงานในพื้นที่ประสบภัยและต้องตกงาน ขาดรายได้

บทเรียนจากภัยสึนามิในครั้งนี้ ประเทศไทยต้องสร้างระบบการเฝ้าระวัง และการเตือนภัยที่มีประสิทธิภาพ และระบบข้อมูลข่าวสารสำหรับการเตือนภัยเบื้องต้น แผนการเตรียมความพร้อมต่อภัยพิบัติ ควรมีการเสริมสร้างพัฒนาความเข้มแข็ง การมีส่วนร่วมของท้องถิ่น โดยเฉพาะเครื่องมือในการป้องกันและการชันสูตรศพทางนิติเวชศาสตร์ ค่อนข้างมีอุปสรรคจากการขาดบุคลากรที่มีความชำนาญ และการเสริมสร้างศักยภาพ การสร้างเครือข่ายความช่วยเหลือเคลื่อนที่เร็ว สิ่งที่มีคุณค่าและสำคัญที่สุด ของบทเรียนครั้งนี้คือ การบริหารจัดการและความช่วยเหลือที่ 29 ประเทศมอบให้แก่ประเทศไทย

คำสำคัญ: **สึนามิ, มหันตภัย, ผลกระทบทางสาธารณสุข**