

Environmental Disasters and Health Problems: Experience from Thailand

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Published: 1 December 2012

ABSTRACT: Nowadays environmental disasters become one of major public health problems worldwide. Each disaster has an impact to the public, causing many lives and illnesses as well as socio-economic damage. The aims of the paper are to describe the situation of the major flood in Thailand and its impact on public health. In addition, the experience for handling the situation is also included in the study. This is a descriptive study. Information was collected from reports of activities under the Department of Disease Control, especially the Bureau of Occupational and Environmental Diseases. In 2011, Thailand faced the worst flood in Thai history. It affected 11 million people or 2.7 million households from 65 provinces with 919 deaths and 1.4 million millions baht loss. After the occurrence of the event, several governmental and non-governmental agencies responded the crisis. The Ministry of Public Health has roles and functions in responsible for provision of public health services and management. The provision of health services under this circumstance included disease prevention and control during and after the flood, emergency medical services, rehabilitation for full recovery in physical and mental health. The Department of Disease Control had set up a strategic plan and actions, called 2P 2R (Protection, Preparedness, Response, and Recovery). In addition, the incident command system included 7 management teams as follows: 1) Strategic and advisory committee, 2) Operation team for disease prevention and control, 3) Risk communication team, 4) Shelter support and medical service team, 5) Logistic support team, 6) Coordination team, and 7) Monitoring and evaluation team. The major flood caused high numbers of mortality and morbidity among Thai people. The illnesses include injuries, communicable diseases, environmental diseases, and mental illnesses. From our experience of disaster response, the strategy of 2P 2R is an effective strategy. Both good incident command and supportive systems are the key success factors.

Key words: Disaster, Flood, Thailand, Public Health Emergency Response

Introduction

Environmental disaster has become a major public health problem worldwide as each disaster has an impact to the public, including the loss of lives, outbreak of diseases and illnesses and other socio-economic damages (Hogan et al., 2002). For the last decade, the trend of disaster occurrence showed an increase in

frequency and severity probably as a result of climate change, urbanization, and population growth. The disasters can be classified into either natural or man-made in nature. The former includes earthquakes, hurricanes, floods, heat wave disasters and tsunamis, while the latter, consists of industrial, technological, and transportation disasters and conflict-related disasters. This paper describes the situation

of the major flood in Thailand during July-December 2011 and its impact on public health. In addition, the experience in handling the situation is also included in the study.

The major flood in Thailand

Thailand faced the worst flood in its history during July to December 2011. The flood was due to several monsoons and continuously heavy rains bringing millions cubic meter of water causing flood throughout every part of the country. The flood affected 11 million people involving 2.7 million households from 65 provinces with 919 deaths and 1.4 millions Baht loss (Department of Disease Control, 2012). The flood also affected health care system. Hospitals and health service centers were seriously damaged and affected the disease prevention and control system including the entire treatment system.

Response by Department of Disease Control

After the occurrence of the disastrous flood, several governmental and non-governmental agencies responded to the crisis. The government had set up a national command center, called The National Center of Flood Response, to tackle the situation. The Ministry of Public Health was entrusted for the provision of public health services and management. The provision of health services under this circumstance includes disease prevention and control during and after the flood, emergency medical services, and rehabilitation for full recovery in physical and mental health. The roles and functions in disease prevention and control are under the Department of Disease Control, the Ministry of Public Health.

The Department of Disease Control has set up a strategic plan and actions for public health emergency including flood since its establishment in 2002. The current strategy

for flood response was 2P 2R which stands for Protection, Preparedness, Response, and Recovery. The aims of protection were to protect hospitals and other health centre premises as well as their staff by arranging Business Continuity Plan (BCP) for the flood. The conceptual framework for BCP consists of a construction plan to protect water from entering the premises, finding new offices for works and giving assignment of staff to work during crisis. The contents of preparedness include setting up of incident command systems. The supportive systems such as communication system, training for health officers, and logistic preparation (medical supply and equipment, PPE, vaccine, etc.) were also established.

The main activities during response and recovery phases under the Department of Disease Control included setting up of disease surveillance system, implementation of disease prevention and control measures, and risk communication to the public. For better coordination, department has developed the Surveillance and Rapid Response Team (SRRT) to tackle public health emergency throughout the country by training local health officers. To date, there are 1088 teams available for such duties.

During the flood crisis, Department of Disease Control has also set up the incident command system to response to the disaster. The system included seven management teams i.e.1) Strategic and advisory committee, 2) Operation team for disease prevention and control, 3) Risk communication team, 4) Shelter support and medical service team, 5) Logistic support team, 6) Coordination team, and 7) Monitoring and evaluation team. Each team consists of managers and staff allocated from executive administrators and health officers from the department. They carried on their duties according to the assigned roles and functions. All teams met with the general director of the department every morning at the war-room

to share information and plan to response to the situation.

One of the main activities under the Department of Disease Control is to establish a special surveillance to collect information for further prevention and control of diseases following the flood. During flood crisis, routine surveillance system was found ineffective, especially the reporting system. Therefore, The Bureau of Epidemiology has attempted to develop a special surveillance system to tackle the situation. In addition, other surveillances were also established to respond to some specific situations, such as flood-related death surveillance. Several types of surveillance were identified included: 1) Routine surveillance for infectious diseases, 2) Syndromic surveillance, 3) Event-based surveillance, 4) Flood-related death surveillance, 5) Enhance hospital-based surveillance, and 6) Chemical poisoning surveillance.

Reported cases under the surveillance

Flood disaster causes many health hazards and illnesses. The major illnesses in 2011 flood include communicable diseases (such as water-borne diseases including leptospirosis and infectious diarrhea), trauma, electrical injuries, chemical poisoning, animal bites, and mental illnesses (Floyd, 2002; Clements, 2009). The surveillance system has identified several major health impacts such as information about flood related death. During the flood in 2011, there were 919 death cases (Bureau of Epidemiology, 2012). Most of them died from drowning. Others included electrocution (14%), trauma from landslide (2%), and other causes (1%). During the flood, the surveillance system has identify some reported cases of major infectious diseases, including 1,301 cases of leptospirosis, 197,680 cases of acute diarrhea, and 10,515 cases of dengue hemorrhagic fever. However, the figures of such reported cases were not higher than the median

numbers of the diseases from the previous 5 years period. In addition, there were no clusters of reported cases or outbreak of major infectious diseases.

Occupational and environmental health issues related to the flood

During and after the flood disaster in 2011, some occupational and environmental health issues were of public concern. These include occupational health and safety issue among responder or rescue teams, chemical release from industries, as well as mold and dust problems after flood. The Bureau of Occupational and Environmental Diseases under the Department of Disease Control implemented some measures to respond to these problems (Bureau of Occupational and Environmental Diseases, 2012). The activities included: 1) Rapid study on Occupational Health problems among rescue workers, 2) Surveillance on chemical release from industry estates to communities, and 3) Investigation of mold and dust problem after flood.

The ultimate aim of the rapid survey on occupational health problems among rescue teams was to identify health hazards and health problems among this group for further provision of occupational health services. The target group was rescue workers from both governmental and non-governmental agencies. The results of the study showed that some of the rescue workers had minor health problems such as fatigue, skin diseases, snake or insect bites, muscular-skeletal disorders, and psychological stress. Regarding the preparedness issues among rescue teams, the study showed that most of the rescue workers have some knowledge about health risk management and response during disaster and know how to protect themselves. However, they still need further support such as personal protective equipment, information and advance knowledge for emergency response, especially public health emergency

response during major disasters. Provision of occupational health services such as annual health check-up was also needed.

Regarding the public concern of chemical release from industries, three governmental agencies, which are the Ministry of Industry, Ministry of Natural Resources and Environment, and Ministry of Public Health, had collaborated to implement measures to resolve the problems. The Bureau of Occupational and Environmental Diseases responded to the situation by conducting two activities with other ministerial agencies, i.e. by monitoring of water quality discharged from the estates and monitoring of heavy metal contamination in nearby communities after flood. The objective of both activities was to assess the levels of chemical and biological contaminations. For the former, 117 samples of water were sampling from 5 industrial estate areas. The parameters measured consisted of physical property (pH, temperature, conductivity, etc.), chemical property (heavy metal, phenol, cyanide, ammonia, grease, oils, etc.), and biological property (total coliform bacteria and fecal coliform bacteria). The results of the study showed that the levels of chemical such as heavy metals, cyanide, NH₃, and VOCs and the biological property from total samples did not exceed the effluent standards. However, only the levels of grease and oil in water exceeded slightly from the standard levels. The latter study was conducted by collecting 40 water samples from communities near to the seven industrial estates and another two communities near to the main waste sites. In addition, questionnaire survey of 246 people from those communities were conducted. The results showed that almost all water samples had the levels of heavy metals within normal standard levels. On the other hand, many people from the communities complained about their health problems such as rash (35.8%), other skin diseases (21.8%), and dyspnea (14.1%).

They suspected their illnesses were due to the industrial chemical contamination during flood.

After the 2011 flood, indoor air quality is one of the major concerns by the public. People were worried about mold and dust in houses and other buildings. Investigation of the problems was carried out by collecting air sample in buildings. For the mold contamination, number of colonies and species of mold were identified. The results showed that numbers of colony count in most of the samples had levels higher than normal standard. Fortunately, the species of mold identified by laboratory tests showed that there were not severe hazardous to health. Regarding dust measurement, the levels of dust from most samples, especially indoor samples were lower than standard level. However, the public still wanted the relevant governmental agencies to eliminate all sources of dust by removing debris and garbage from residential areas immediately.

Lesson learned from the response

After accomplishing response and action, the Department of Disease Control had set up a policy for all agencies under the department to evaluate activities and achievement. The Bureau of Occupational and Environmental Diseases also conducted "After Action Review" to assess the activities during disaster. All staff was invited to join the meeting to share their experiences. Among the good practices were: 1) Setting up of the war room for facilitating the command system, 2) Dedicate staffs to their work, work hard and having enough competency, 3) Provide enough support of policy and budget, 4) Prepare all document or information in time, 5) Stand by laboratories to analyze samples, 5) Establish further good relationship with stakeholders and network. In additions, the issues that need improvement include: getting access to some facilities such as

transportation, logistics, and information, supportive system for knowledge and information transfer to hospitals and health service centers, establishing command line, and preparing for the improvement of business continuity plan.

Conclusions

Environmental disasters issue has become one of the most important public health problems. They can cause high numbers of mortality and morbidity. The illnesses include injuries, communicable diseases, environmental diseases, and mental illnesses. Affected population are both the public and health professionals as well as rescue workers. Public health organization and other relevant agencies as well as the public have to prepare to respond to the crisis. From our experience of disaster response, the strategy of 2P 2R (protection, preparedness, response, and recovery) is an effective strategy. Both good incident command and supportive systems are the key success factors.

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