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Ferry Boat Injuries and Deaths in Pattaya, November 2013; Its' Time for Thailand to Reclaim its Safe and Smile Traveling

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Abstract

On 3 Nov 2013, the Bureau of Epidemiology was notified of a ferry boat accident in Pattaya, Chon Buri Province. At least six deaths and 16 severe injuries were reported. The investigation team conducted a descriptive study to describe potential risk factors associated with injury and death, and determine the effectiveness of interventions on injury prevention after the accident. All medical records related to injuries and deaths from four hospitals were reviewed and interviews were held with patients, crew, heath volunteers, rescuers and local authorities. The team also observed ferry boat transportation services. Medical records of 37 hospitalized injuries, including seven deaths, were reviewed. Of these, 59% were males, with median age of 31.5 years. Major causes of injury were muscle strain (35%), aspiration pneumonia (19%) and submersion (14%). Five out of seven fatalities used a buoyancy aid, with one victim's buoyancy aid reported to be "riding up", which led to drowning. Overcapacity of the boat and inappropriate wearing of buoyancy aids accounted for the injuries and deaths. A multi-sectorial approach was essential to resolve safety issues resulting from resource constrained public transportation services.

Key words: buoyancy aid, injury, boat, Chon Buri, Thailand

Introduction

Boat journeys were the second most common mode of travel in Thailand, accounting for 9.5% of Thailand's transportation in 2009.[1] In 2013, 30 boat accidents, which resulted in 34 injuries and six deaths, were reported to the Marine Department, Ministry of Transport, Thailand. Four of these accidents occurred in Pattaya, Chon Buri Province, causing 13 injuries and three deaths, the highest number of injuries and deaths compared to other provinces. Of the four accidents in Pattaya, speed boats accounted for three. The other incident involved a ferry boat, which was the first accident of this type of boat in Pattaya.[2]

Pattaya is a popular tourist area for both domestic and international visits. Each year approximately two million tourists or 45% of tourists who visit Pattaya,[3] travel between Pattaya and the island of Koh Larn which are located approximately seven kilometers apart. There were two types of boat service: speed boats (Figure 1) and ferry boats (Figure 2).

Figure 1. Speed boats parking along the beach to board more passengers in Pattaya, Thailand, November 2013

Figure 2. Ferry boat transporting between Koh Larn to Pattaya, Thailand, November 2013, showing passengers without buoyancy aids and no size fit for children

Speed boats are smaller and faster, with a capacity for 20-80 passengers. It takes approximately 20 minutes for each trip between Koh Larn and Pattaya. Ferry boats are larger with capacity of 150-200 passengers and take approximately 30-45 minutes to travel between Bali Hai Port in Pattaya to Na Baan or Ta Waen Port in Koh Larn. The cost of traveling by a ferry boat was cheaper than a speed boat, costing 30 Baht compared to 100-200 Baht for a speed boat.

The Bureau of Epidemiology (BOE), Ministry of Public Health (MOPH) was notified by the Provincial Health Office (PHO) of a fatal boat accident in Pattaya, Chon Buri Province (Figure 3) which occurred at approximately 17:00 on 3 Nov 2013. The BOE team, including members from PHO, 3rd Office of Disease Prevention and Control (ODPC) investigated the incident to describe potential risk factors associated with injury and death from the boating accident, and determine the effectiveness of interventions on injury prevention after the accident.

Methods

Descriptive Study

Medical records related to the ferry boat injuries and deaths from four hospitals in Chon Buri Province, including Bangkok Pattaya, Samitivej Sriracha, Banglamung and Paolo Memorial Hospitals, were reviewed for demographic characteristics of the injured persons, fatalities and injury-related information.

Hospitalized injured passengers, boat crews in other nearby boats and rescuers that witnessed the accident were interviewed using a structured questionnaire to record a description of the accident, confirm the safety equipment on board and describe the rescue procedures during the accident.

Additionally, we interviewed health volunteers and staff from Department of Disease Prevention and Mitigation in Marine Department, and Director of the Pattaya Business and Tourism Association to obtain information on current prevention and control procedures of boating accidents using structured questionnaires.

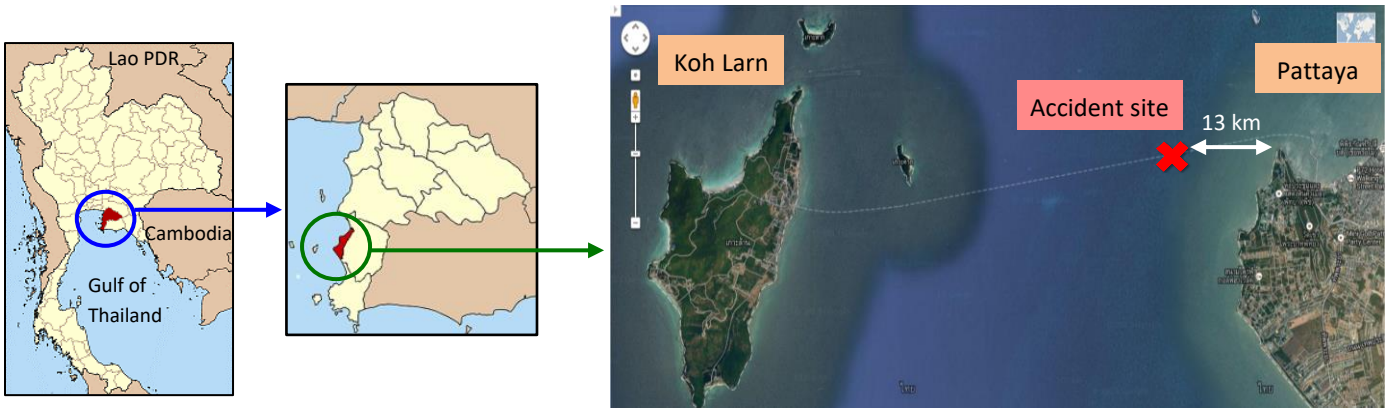
Environmental Observation of Other Boat Services

On two occasions the investigation team also observed other ferry boat transportation services between Pattaya and Koh Larn at approximately 17:00. The team used a checklist to observe type and number of available buoyancy aids, monitoring systems for overcapacity loading, information available onboard regarding emergency procedures in case of an accident, and crews' ability to inform and encourage passengers to wear their buoyancy aids.

Data Analysis

The Haddon Matrix framework[4,5] was used to analyze data by describing accident-related factors (pre-event, event and post-event), interviews with captain, crew members and passengers, and observing ferry boat safety equipment and socio-economic environment.

Reviewing medical records of four hospitals identified 18 mild injuries, 12 severe injuries and seven deaths.



(a) Thailand (b) Chon Buri Province (c) Accident site between Koh Larn and Pattaya

Figure 3. Map of accident site between Koh Larn and Pattaya, Chon Buri Province, Thailand

Results

Descriptive Study

Of the injuries and deaths, 59% were males, with median age of 31.5 years (Interquartile range 21.3-47.8). The victims included 28 (76%) Thai, four (11%) Russians, three (8%) Chinese and two (5%) persons with unknown ethnic background (5%).

Among the injured passengers, common diagnoses were muscle strain (35.1%), aspiration pneumonia (18.9%) and submersion injuries (13.5%). Of the seven deaths identified, which included four males and three females, three were from Thailand, two were Russians and two were Chinese. Six persons were dead on arrival at hospital while one was in a coma and one had died during the period of investigation (Table 1).

Table 1. Physicians' principal diagnosis of injured people from a boat accident in Pattaya, Thailand, 3 Nov 2013 (n=37)

Diagnosis	Number of case	Percent
Muscle strain	13	35.1
Aspiration pneumonia	7	18.9
Submersion injury	5	13.5
Bronchitis	2	5.4
Head injury	1	2.7
Middle ear barotrauma	1	2.7
Open maxillary fracture	1	2.7
Coma	1	2.7
Dead on arrival	6	16.2

Event Description

According to 10 passengers, three boat crew from other companies who witnessed the accident, two rescuers, three health volunteers and the Director of Pattaya Business and Tourism Association, at 17:00 on 3 Nov 2013, engines of the ferry boat suddenly stopped on the way from Koh Larn to Pattaya for no apparent reason. Then, although the ferry began to sink, no announcement was made by the captain. Passengers reported that there were insufficient buoyancy aids available for all passengers and there were no buoyancy aids that could fit children.

Rescue efforts were limited as other speed boats and ferries nearby were already overloaded with passengers on board and could not pull victims out of the water. A rescue boat arrived at the accident site only after 30 minutes later due to lack of communication and rescued some of the passengers. The emergency response usually took 20-30 minutes from notification to arrival at the scene and approximately 20 minutes to reach the nearest hospital. Thus, for some of the victims, the rescue efforts were too late to save lives.

Factors linked to the loss of life included selling and drinking of alcohol on board, and lack of information about total number of the onboard passengers (Table 2). The rescue team estimated that approximately 230 passengers were on board, travelling from Koh Larn to Pattaya at the time of the accident. However, there was no official record of the actual number of people on board or their identities. Since this boat was the last one leaving from Koh Larn on that day, more people boarded it. Thus, this boat was probably carrying more passengers than the registered maximum capacity. Information obtained from survivors indicated that one of the passengers who was wearing a buoyancy aid had died. The rescuers also stated that five out of seven victims had their buoyancy aids on.

Environmental Observation of Other Boat Services

The average capacity of ferry boats varies from 150-200 passengers, according to size of boat and registered maximum capacity printed on the hull. Daily random inspection on maximum capacity of boats was conducted by marine officers at the port. However, boats could pick up more passengers along the beach during the trip (Figure 1).

During our observation, although we saw a few buoyancy aids, no instructions were provided on board (Figure 4).

Figure 4. Buoyancy aid on a ferry boat without leg strap (left) compared to the standard buoyancy aid used by the recue team (right), Pattaya, Thailand, November 2013

Discussion

The BOE team identified a number of risk factors associated with injury and death resulting from this ferry boat accident. Categorizing them according to the Haddon Matrix framework, there were specific pre-event, event and post event factors that could be highlighted for future prevention interventions.

Table 2. Information obtained from boat crew and passengers, boat safety equipment and environment from a boat accident in Pattaya, Thailand, November 2013, using the Haddon Matrix framework

	Boat crew	Passenger	Boat safety equipment	Environment
Pre-event	- Alcohol drinking and selling on board - No regular check on wearing buoyancy aids by passengers - Did not tell passengers to wear buoyancy aid - No warning announcement of the boat sinking - Did not aware of maximum capacity of the boat	- Some did not wear their buoyancy aids - Language barrier - Different swimming skill	- Only few buoyancy aids available - Inappropriate design of buoyancy aids and size - No media instruction (e.g. poster) for wearing buoyancy aids and emergency evacuation	- Too many passengers on board - Shortage of staff from the Marine Department to inspect and monitor ferry and speed boats - Picking more passengers up along the beach outside the port - No regulation for passengers to put on their buoyancy aids
Event	- Did not contact the recue team	- Panic among passengers - Did not get out of the boat	- Fighting over buoyancy aids	- No assistance from other ships that passed nearby due to overloading with passengers
Post-event	- Limited rescue effort from the surrounding boats - Delayed rescue, no triage and CPR at scene - Long time to transport the victims to hospitals - No official records of the actual number and identities of the passengers from the rescuers - No compensation for victims from the company			

Boating played an important role in tourist attractions[6,7] and accounted for 6% of the country's total GDP in 2011[8]. Although the tourism industry in Pattaya had been growing cumulatively at 15% annually during 2010-2012,[2] budget for the Pattaya Local Marine Department had remained the same, resulting in insufficient staff to achieve effective safety management and prevent boat accidents.

Koh Larn is one of the most famous attractions in Pattaya for tourists from various countries, including non-English speakers such as Chinese and Russians. According to the Tourism Authority of Thailand, tourists from these countries were rapidly increasing.[9] This also highlighted language barrier problem. Even though most of officers and workers in Pattaya could speak English, very few could speak Russian and Chinese. This might have obstructed communication about safety procedures such as giving instruction on buoyancy aid or emergency procedures, as most of the communication materials and the media were presented only in Thai and English. The language barrier between tourists and lack of enforcement on policies related to mandatory use of buoyancy aids made it difficult to maintain adequate safety levels.

When the accident occurred, both the ferry boat crew and the passengers panicked. There were no instructions in locating the buoyancy aids, putting them on or using them in the water. No evacuation procedures were instructed by the crew. More panic ensured when there was not enough buoyancy aids for all passengers and crew. Additionally, from the team's observation on boat safety equipment from other companies covering the same route, we found that buoyancy aids were not appropriately designed. The design defect of buoyancy aids and inappropriate method of wearing them might have resulted in 'riding up', i.e., the buoyancy aid floating up over head and pushing the person's head under the water, resulting in drowning. According to the documents of the Marine Department, Ministry of Transport, there were specifications only for the life vest and appropriate specifications for buoyancy aids were still under revision.[10-13]

Rescue teams arrived at the scene only after 30 minutes, which was too long as the drowning victims must be resuscitated within 30 minutes[14]. Therefore, survival for drowning victims must not only depend on rescue teams alone, but boat crews must be trained in use of safety equipment and cardiopulmonary resuscitation (CPR). Although these training sessions should be coordinated by district health center and the Marine Department, it had not been provided as regular training for boat captains and crew or mandated by laws.

Limitations

There were not any official records from the rescue team or details regarding total number of person rescued and victims' identities. In addition, some boats that had passed by might have picked some victims up. Thus, the total number of

survivors might not be accurate. The medical record of the deaths did not describe any of victim's general appearance and there were no physical examinations. We could not obtain the final diagnosis of drowning victims from the Institute of Forensic Medicine at the Police Hospital.

In addition, we were not able to interview the company's staff including the crew and the captain, take photos of the boat, or inspect the buoyancy aids and other safety equipment of the boat that was involved in the accident on 3 Nov 2013. This was due to the ongoing police investigation. Thus, the information we did obtain from the survivors might not be sufficient to explain why or how the boat sank.

Conclusion

After the investigation, we presented our investigation report and recommendations to all responsible authorities, including the Deputy Permanent Secretary of MOPH, the National Institute of Emergency Medicine, members of the Marine Department, Chon Buri PHO, 1st and 3rd ODPC, the Department of Disaster Prevention and Mitigation, and the Director of Pattaya Tourism Association. Then, we held discussions about prevention and control measures. Right after the discussion, local authorities in Pattaya ordered all registered ferry boats to cancel their services until safety requirements were met. On 12 Sep 2013, the Ministry of Tourism and Sports initiated a travel safety plan to reduce the number of all boating related accidents in Pattaya.[15] In collaboration with multi-sectorial organizations, the MOPH and the Pattaya Tourism Association developed a plan for annual rescue simulation exercises to reduce number of casualties and save more lives.

This boating accident, along with others, had a negative impact on tourism industry in Pattaya and forced the government to take action.[16,17] However, the rapid growth of the tourism industry in Pattaya rendered the local officers unable to effectively and efficiently carry out their mandate due to limited resources. Being unable to monitor and enforce the law has resulted in increased injuries and death. A multi-sectorial approach was needed in order to overcome this problem in this constrained resource setting to achieve positive outcomes related to all boat travels.

Recommendations

The following recommendations should be implemented in a timely manner. First of all, before departure, the captain must report the total number of passengers, destination, crew contact list, and departure and returning schedule to the local marine officer. As selling of alcohol on ferry boats, according to regulations of the Marine Department, is strictly prohibited, this should be enforced with multi-sectorial approach as the MOPH lacks the appropriate authority.

The Marine Department should also ensure that all boat companies provide all passengers with brochures on safety in multiple languages before the boat leaves the port. The brochures should include information on what to do in case of an emergency, including how to correctly put on buoyancy aid. The crew should also provide onboard demonstrations of putting the buoyancy aid on and make sure all passengers are wearing them. Compliance with these safety precautions should be randomly checked by local marine officers at least once a week. Boats found to be overcapacity or with passengers not wearing a buoyancy aid, should not be allowed to operate.

The provision of a boat license and safety regulations should be tightened, particularly on ferry and speed boats. All boat services should have reliable and up-to-date insurance for their passengers. In addition, the Marine Department should be responsible for inspecting tourist boats to assure regular maintenance and safety.

Ferry and speed boats should carry passengers only from official ports so that local marine officers could check effectively for safety issues. The number of coast guards and patrol boats should be increased. Patrol boats should provide service daily and cover more areas around Koh Larn beaches. Above all, regular monitoring and policy enforcement will be an ongoing requirement to prevent future events.

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