



Rescue and Emergency Management of a Water-Related Disaster: A Bangladeshi Experience

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Authors' contributions

This work was carried out in collaboration between all authors. Author AB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors JH, AB, SRM and ASMA managed the analyses of the study. Author DHH managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: The Padma, one of the largest rivers in the world, is crossed by thousands of people every day by boat or launch (a local made ferry). However, the number of launches is insufficient, and launches are frequently overloaded with passengers. The authorities do not strictly enforce waterway rules. On 22 February 2015, a cargo vessel hit a launch carrying over 200 passengers in the Padma near Paturia launch terminal, Manikganj, Bangladesh. At least 79 people including 14 children and 28 women died and over 50 went missing. Here we examine the rescue process and emergency management services during this event.

Methods: Qualitative methods, including in-depth interviews and reviews of the daily national newspaper reports on the disaster event and related documents were performed.

Results: At 11:40 am, the launch sank in middle of the river 15 minutes after it had left the terminal

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after collision with a cargo vessel. The launch was carrying 200 passengers even though its capacity was 140. Around 100 passengers were either rescued or swam about half a kilometer to reach the shore. Locals started rescuing passengers immediately after the accident with the help of boats and trawlers from both sides. Around 150 members of different government rescue agencies participated in the rescue operation from 12:00 noon to midnight. A rescue vessel reached the accident site at around 11.00 pm to salvage the sunken vessel. After 24 hours of rescue operations, 70 bodies were handed over to family members.

Conclusion: Emergency management was inadequate, and the launch authorities did not take appropriate measures to rescue passengers from drowning. Mass public awareness is essential to enforce the rules for safe river crossing. A national level policy is required for mass rescue during water-related disasters.

Keywords: Disaster; emergency management; rescue; Padma River; Bangladesh.

1. INTRODUCTION

Drowning is one of the leading causes of deaths worldwide [1], with children and individuals from developing countries the most common victims [2]. In Bangladesh, drowning is the one of the leading cause of death in children of age group 1-4 and 5-9 years. Bangladesh health and injury survey conducted in 2016 revealed that 11.7% of injury mortality is due to drowning [3]. Health bulletin in 2016 also highlighted drowning is the leading killer in Bangladesh [4]. Earlier, a study found that drowning accounts for 27.9% of mortality in children in Bangladesh [5]. Water related disasters like cyclone, tsunami etc. are the major obstacle in achieving human security and sustainable socio economic development of the community, especially in developing countries where such disaster often occurs [2,6]. In between 2000 to 2006, about 2163 water-related disasters were reported globally, amounting to 290,000 dead, 1.5 billion injured, and 422 million USD in damages. Over 83% of water-related disasters occurred in Asia [6].

Disaster is a consequence of inappropriate risk management including both hazards and vulnerabilities [7]. In developing countries, about 95% of all deaths are caused by disaster hazards, 20-times greater than in industrialized countries [8,9]. With respect to disaster risk, Bangladesh is one of the most vulnerable countries in the world, and many people have died or become disabled due to disasters [10,11], with water-related natural and manmade disasters most commonly encountered [12]. In Bangladesh, waterways are an important means of transport, with 87.8 million passengers carried by water every year [13]. About 8000 people have died due to launch (a local made ferry) drowning over the last two decades in Bangladesh [14], and over the last 38 years as

many as 550 launch accidents have occurred resulting in at least 4420 deaths, 520 injuries, and 400 people missing. In 2014 alone, there were 41 launch accidents [15]. Between 1977 and 2000, the Bangladesh Inland Water Transport Authority (BIWTA) recorded a total of 248 launch accidents accounting for 2309 lost lives, 374 injuries, and 208 missing. Thus, there are discrepancies between different data sources. Nevertheless, man-made water-related disasters are more common than natural disasters. The most significant cause of launch accidents is due to collision followed by overloading of boats [12]. Deadly accidents are further exacerbated by unfit or poorly maintained vessels, unskilled crews, and below standard inland water transport channels. Underlying this is negligence, mismanagement, and poor law enforcement by the authorities in Bangladesh [13]. This paper explores the rescue process in detail and how emergency management was initiated and whether lessons were learnt.

2. METHODS

This was a qualitative study involving review of national newspaper articles related to the ferry disaster and in-depth interviews (IDIs) with volunteers, rescuers, and observers of the disaster and rescue operation. This qualitative research technique has the advantage of exploring the interviewee's perspective in a particular situation [16].

2.1 Information Collection

Two main techniques were used to collect relevant information related to rescue and emergency management: (i) reviewing electronic and printed media reports including newspaper coverage; and (ii) in-depth interviews (IDIs) with

the person involved in rescue and emergency management. To review the newspaper materials, two most popular circulated daily Bengali national newspapers and another two English national newspapers were selected.

2.2 In-depth Interview Checklist

A semi-structured checklist was developed and used for IDIs. A total of five IDIs were conducted and included one volunteer and one rescuer involved in the rescue, two people observing the events, and one with the rescue authority. In the checklist, four thematic areas were identified for discussion and included: (i) understanding of the event; (ii) logistics in the launch to prevent drowning and rescuing after drowning; (iii) initiation of the rescue and emergency management; and (iv) the challenges and limitations encountered during emergency management. To explore each of the discussion areas, several prompts were used (Table 1).

2.3 Data Collection and Analysis

In-depth interviews were audio recorded with prior permission from the interviewees, and hand notes were taken for some of the thematic areas during face-to-face conversations. The IDI session facilitator used prompts to explore the desired information, and the session was also audio taped with the respondents' permission.

After the interviews and discussion, a two-member team under the guidance of the researchers prepared Bengali transcripts of the audio records. The transcripts were then translated into English.

Analysis was performed by examining the transcripts and note-taker's notes in detail to identify the range of ways in which the participants responded to various prompts. Thematic analysis was performed for IDIs, whereas content analysis was performed to analyze electronic and print news media.

Verbatim transcriptions of the recordings were immediately undertaken after interview by the interviewers. An expert first made all transcriptions in Bengali and then in English. Public health specialists also checked the transcriptions for accuracy.

Qualitative content analysis was conducted as per Graneheim and Lundman [17], which is a widely used method in qualitative social science. There is flexibility in interpretation of the text in qualitative content analysis. The participant's words can be analyzed as actual content, and interpretation and judgment of participants' responses can be analyzed as latent content [18]. We analyzed the data with a repeated look over the written transcription to identify each meaning unit [17] and by listening the audio recorder. Two Bengali and three English national newspapers were also reviewed.

Table 1. Checklist for conducting IDIs

Qualitative method used with age range	Area of discussion	Prompt used
IDI (25 yrs–45 yrs) volunteer, rescuer, general people	Understanding the events	(i) What happened? (ii) How did it happen? (iii) What was level of damage?
	Logistic management in the launch for rescuing	(i) What logistics were maintained in the launch to prevent drowning? What logistics were used to rescue the passengers?
	Initiation of rescue and emergency management	(i) How was rescue and emergency management initiated? Who was involved?
	Disaster response of the hospital administrators	(i) How prepared was the hospital? (ii) How did hospital administrators act?
	Challenges during emergency management	(i) What were the strengths? (ii) What were the challenges faced during rescue and emergency management?

2.4 Ethical Issue

The study did not use any patients and/or victims of her/his family members related to the disaster. We had used information by (i) reviewing electronic and printed media reports including newspaper coverage; and (ii) conducting in-depth interviews (IDIs). The IDIs were conducted with one volunteer and one rescuer involved in the rescue, two people observing the events, and one with the rescue authority. In any case we did not get their identity. Before inviting them for participating in the IDI we had explained that the participant could withdraw at any time during the IDI. Also during IDI we had focused on understanding the events, logistic management in the launch for rescuing, initiation of rescue and emergency management, disaster response of the hospital administrators and challenges during emergency management. The study had neither dealt with any sensitive and personalized information nor with any personal identity. Therefore, the study did not seek any ethical permission.

3. RESULTS

A tragic manmade disaster occurred in the Padma River when a launch capsized mid-river 15 minutes after it left the Paturia terminal for the Daulatdia terminal after impact with a cargo vessel. The launch was carrying 200 passengers, even though its capacity was 140. Around 100 passengers were either rescued or swam around half a kilometer to reach the shore. At first, local people started rescuing passengers immediately after the accident with the help of boats and trawlers from both sides of the river. Around 150 members of the Navy, Coast Guard, Fire Service, Bangladesh Inland Water Transport Authority, Bangladesh Inland Water Transport Corporation, and district administration participated in the rescue operation from 12:00 pm to midnight. Rescue vessels reached the spot from Mawa ghat after 12 hours to salvage the sunken vessel. After 24 hours of the rescue operation, 79 bodies were handed over to family members. Newspaper reviews revealed that the launch did not have the necessary logistics to rescue passengers and also prompt in rescue and emergency management was deficit. Overcrowding and lack of skills of the passengers on how to rescue caused high fatality.

3.1 Review Findings

At around 11.40 am on 22 February 2015, a tragic water-related disaster occurred when a

launch (the MV Mostafa) capsized in the middle of the Padma due to collision with a cargo vessel within 15 minutes of leaving the Paturia terminal for the Daulatdia terminal. The launch was carrying over 200 passengers, even though its capacity was 140 [19]. Overcrowding was identified as the main cause of this disaster [20]. Seventy people, including 19 children and 24 women, died [21]. Six months previously, a similar disaster had occurred in same river, resulting in over a hundred deaths [22]. Local people started rescuing passengers immediately after the accident using boats and trawlers from both sides of the river prior to trained forces arriving to rescue dead or alive passengers. Twelve hours later, a rescue vessel finally reached the site of the accident to salvage the sunken vessel.

3.2 Area of the Disaster

Paturia, a launch terminal, is located about 20 km northwest of the Manikganj district and 71 km northwest of Dhaka, Bangladesh. Hundreds of launches and ferries cross the Padma River each day, with thousands of passengers travelling from the Paturia terminal to the Daulotdia terminal, Rajbari district. The MV Mostofa capsized in the river immediately after collision with the Nargis-1 cargo vessel 15 minutes after it left from Paturia for Daulotdia.

3.3 Description of the Disaster

A tragic water-related disaster occurred on 22 February 2015 at around 11:40 am when a launch (the MV Mostafa) capsized mid-river in the Padma 15 minutes after it left the Paturia terminal for the Daulatdia terminal. The overloaded launch capsized after collision with a cargo vessel, the Nargis-1, coming from the opposite direction. This information was collected from different daily newspapers and media.

One of the observers during an IDI said, "*I saw a cargo vessel hit the launch immediately after the launch left from the terminal, and the launch was overcrowded*"

During an IDI, the volunteer said, "*About 10 minutes after the launch had left the terminal, I saw a cargo vessel hit it on the left side and some passengers travelling on the upper deck jumped from the launch and swam to the cargo vessel.*"

3.4 Gaps and Causes Identified for the Disaster

The launch was carrying over 200 passengers, even though its capacity was 140. Overcrowding was identified as the main cause of this disaster. Around 90 to 100 passengers were either rescued or swam about half a kilometer to reach the shore, according to witnesses and locals. Specialists reported that this type of accident occurs due to violation of vessel driving rules. The main five reasons are: vessel structure or technical fault; weakness in vessel driving; passengers or goods carried the wrong way; undermining vessel stability; additional passengers or cargo carried in vessels and storm; or natural disaster. This information was collected from the daily newspaper.

The rescue authority said during the IDI, *"It was winter when the weather was normal and there was no current in the river. The Padma river was calm and quiet when the accident occurred, which was totally unexpected. The accident took place due to the reckless attitudes of the master or drivers of water vehicles."*

One of the observers said, *"The launch capsizing was not an accident rather it was a consequence of frequent and continuous irregularities and mismanagement, example which proves that all the management structure in that area was useless and inactive."*

The rescue authority said, *"Additional police should be enrolled in the launch terminal to avoid overloading, especially during Eid and Puja festivals and to ensure the highest coordination among all agencies involved in the waterway."*

During an IDI, one volunteer said, *"There was no facility in the launch for rescuing passengers if any drowning occurred. Even the authorities didn't follow any rules to prevent such a disaster."*

3.5 Initiation of Rescue and Emergency Management

Around 150 members of the Navy, Coast Guard, Fire Service, Bangladesh Inland Water Transport Authority (BIWTA), Bangladesh Inland Water Transport Corporation (BIWTC), and district administration participated in the rescue operation from 12:00 pm to midnight. The rescue vessel reached the site of the accident from

Mawaghat at around 11.00 pm to salvage the sunken vessel. During an IDI, a rescuer said, *"The Bangladesh Inland Water Transport Authority, Bangladesh Inland Water Transport Corporation, and the river police jointly launched a rescue operation around 12:00 noon and rescued at least 60 people"*

A volunteer said during an IDI, *"At first, local people started rescuing passengers immediately after the accident with the help of boats and trawlers from both sides from the Dauladia and Paturia terminals."*

During an IDI, one observer said, *"Many passengers jumped into the river from the launch's roof soon after the collision. Several fishing trawlers and boats came to our rescue. The river police then took around 30 of them to the shore,"*

The newspaper and media reported that two control rooms had been set up at Dauladia and Paturia on behalf of the DCs of Rajbari and Manikganj districts to perform rescue operations properly. The Rustom rescue vessel, which reached the site of the accident from Mawa at around 11.00 pm, salvaged the sunken vessel.

3.6 Outcome of the Disaster

After around 24 hours, divers recovered 79 bodies including those of 14 children and 28 women. 70 bodies were handed over to their families along with TK 20,000 to carry the bodies to their homes, according to newspaper and television reports.

One newspaper reported a survivor saying, *"I along with four others, escaped through a narrow hole in the boat when it flipped upside down. Some of the victims were trapped in the lower deck of the boat. Our correspondent said hundreds of people were waiting outside a makeshift morgue to claim the bodies of their relatives."*

During an IDI, a volunteer said, *"A man broke down and cried, seeing the body of a family member killed in the launch disaster."*

During an IDI, one observer said, *"The search for bodies continued for the next one or two days. But the assurance did little to calm the family members who were still looking for the bodies of their loved ones."*

The rescue authority said, "The loss cannot be regained by money, though the Shipping Minister declared hundred-thousand-taka compensation for each family of the victims and the district administration Tk. 20,000 for each of the families."

3.7 Challenges during Rescue and Emergency Management

The government formed an investigation committee to make recommendations after this disaster, who were asked to submit the report within 15 working days. The committee made recommendations, but no action was taken with regard to the fitness of the vessel. The sunken launch was located and tied to boats with ropes, the capsized vessel lying 35 to 40 feet underwater and below 50 tons. The BIWTA rescue vessel IT-389 started rescuing 12 hours after the disaster and brought the capsized launch ashore. Many challenges were identified with respect to rescue and emergency management (Fig. 1).

One of the people during an IDI said, "Irregularities and mismanagement are the main

causes of the accident, and execution of strong punitive laws are a must against corrupted officials and launch owners."

One of the volunteers said, "I saw a boy crying as his father [who was in the launch] was still missing. He also shouted, "Who would return his father?" Where should he go to complain?"

About the rescue activities, one observer said, "We didn't see much activity from the rescuers after the launch was salvaged. Rather, the local people were more engaged in rescuing."

4. DISCUSSION

The devastating ferry disaster in the Padma River occurred due to the launch being overloaded and crowded. It resulted in the loss of 79 lives. Rescue management was unstructured, and the rescue team was not prepared to handle such a disaster. Therefore, the death toll was much higher than it should have been. Similar type of accident occurred in the river Padma in 2014 due to overloading. Ferry carried about two hundred passengers instead of having capacity

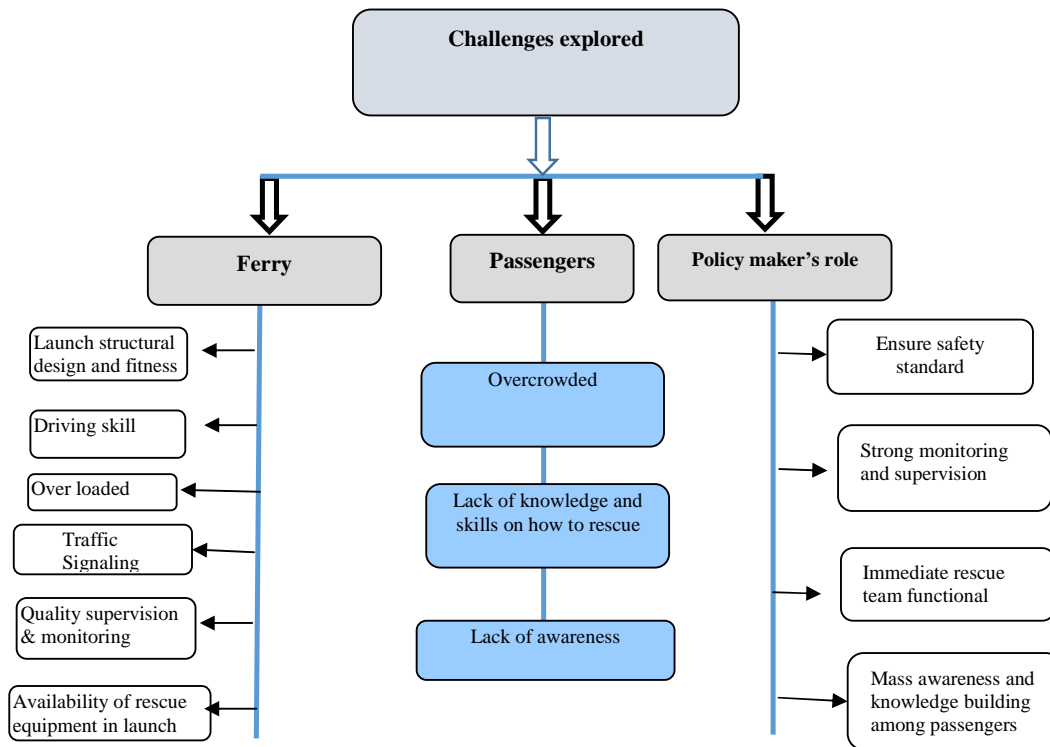


Fig. 1. Challenges explored during the disaster
OBS! Local made ferry in Bangladesh is called as 'launch'

of carry one hundred passengers and it sank in the middle of the river [23]. According to the president of the Bangladesh Society of Master Mariners overcrowding is the most common cause of ferry accident which is about 35% in Bangladesh [23].

Lack of knowledge, awareness and skills are the key barriers for the passengers to be rescued in such disaster was identified. According to the report of BITWA at least 5000 people died from ferry accidents in Bangladesh in last 13 years [23]. One study emphasized on individual awareness through campaign on safety during traveling on the river to reduce risk of disaster [13].

In this study explored areas like structure of ferry, its design, fitness, traffic signaling, driving skills, and availability of rescue equipment's needs for further improvement. It has been reported that poor design and maintenance and lack of safety standard in the ferry causes accident in the rivers of Bangladesh [23]. A study revealed that about half of the water routes vessels do not have registration even proper design and necessary safety equipments are not ensured in most of the authorized vessel. BIWTA has constraints of having advanced rescue vessels, skilled manpower's including highly trained rescuers to support immediate after any water related disaster [13].

Bangladesh has many rivers, and waterways are commonly used for communication and transport. However, about 95% of small- and medium-sized vessels including boats, launches, and ferries do not follow even minimum transport rules, which is a major cause of drowning disasters in the country. Overcrowding and poor maintenance are often contributing factors to accidents, and the government has regularly vowed to strengthen enforcement of safety standards after fatal accidents [12].

There have been many launch accidents in Bangladesh, which have resulted in thousands of deaths. About 658 launch incidents have been reported, around 5,500 people have lost their lives, and over 1,500 people have gone missing. Around 393 families vanished completely, and 656 families lost their only income generators over the last 20 years [24]. Water-related disasters are not uncommon in Bangladesh, the largest disaster occurring in 2014 when 41 launch-related drownings occurred in one year. The most common cause these disasters was collision followed by overloading [14].

The disaster described here took place only six months after a double-decker launch (the Pinak-6) sank with over 200 passengers on board in the River Mawaghat, Munshiganj, resulting in over a hundred deaths [18]. Although the number of people requiring water vessels far outstrips their availability, peoples have a tendency to cross rivers on overloaded vessels. On the other hand, the launch industry is beneficial for the country. Overloading is particularly common during festivals. Furthermore, launches sometimes carry commercial cargoes, making them more unstable [12]. Although water-related disaster fatalities decreased globally between 1980 and 2006, the number of affected people and economic damages increased. Asia is most vulnerable to water-related disasters, and over 45% of fatalities and 90% of people affected by such disasters are in this region [25].

Vessel collisions are one of the major causes of water-related drowning globally. Various factors contribute to such collisions, many of which can easily be overcome in Bangladesh [26]. However, there are many obstructions to properly constructing water vessels and supplying adequate skilled manpower in Bangladesh, but these problems are not insurmountable [27]. Stability failure causes 49% of ferry accidents, and 36% are due to overloading [14]. However, natural disaster fatalities in Bangladesh decreased from 300,000 in 1970 to 5000 in 2007 only by improving disaster management [6]. Therefore, it is possible to decrease fatalities from manmade disasters by enforcing water trafficking rules, enforcing the law, proper logistic maintenance of rescue logistics, and public awareness.

5. CONCLUSIONS

We found that the rescue and emergency management was inadequate. Although the disaster was manmade, it was preventable. A number of challenges have been identified that can be used as the focus for improvement and initiatives for intervention. Overloading of the launch should be prevented, drivers should be skilled and experienced, and the necessary rescue logistics for saving lives from drownings need to be provided. A well-equipped rescue team should be ready in every terminal to ensure immediate rescue and management for any drowning. Mass public awareness is essential with respect to safe crossing of rivers. A national level policy is required for the mass rescue of people during water-related disasters. Moreover,

all passengers should be aware about weather forecasts and swimming should be learnt nationwide.

CONSENT

It is not applicable.

DATA AVAILABILITY

Raw data of qualitative in-depth interviews are audio recorded in local Bengali language, newspaper reference used in the reference section and data can be available upon request by contacting corresponding author.

DISCLAIMER

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Peden M, McGee K, Krug E, (Eds). Injury: A leading cause of the global burden of disease, 2000. Geneva, World Health Organization. 2002.
Available:http://www5.who.int/violence_injury_prevention
2. Rahman A, Mashreky SR, Chowdhury SM, Giashuddin MS, Uhaa IJ, Shafinaz S, Hossain M, Linnan M, Rahman F. Analysis of the childhood fatal drowning situation in Bangladesh: Exploring prevention measures for low-income countries. *Inj Prev*. 2009;15(2):75–9.
3. Bangladesh Health and Injury Survey (BHIS); 2016.
4. Health Bulletin. Directorate General of Health Services; 2016.
Available:http://www.dghs.gov.bd/images/docs/Publications/HB%202016%202nd%20edition_13_01_17.pdf
5. Rahman A, Giashuddin SM, Svanstrom L, Rahman F. Drowning-a major but neglected child health problem in rural Bangladesh: Implications for low income countries. *Int J Inj Contr Saf Promot*. 2006;13(2):101–5.
6. Adikari Y, Yoshitani J. Global trends in water-related disasters: An insight for policymakers. The United Nations World Water Development Report. Water in a Changing World; 2009.
Available:<http://unesdoc.unesco.org/image/s/0018/001817/181793e.pdf>
7. Quarantelli EL. Where we have been and where we might go, what is a disaster?: A Dozen Perspectives on the Question. London, Routledge. 1998;146–59.
8. Disaster Risk Management. The World Bank; 2015.
Available:<http://www.worldbank.org/en/topic/disasterriskmanagement>
9. Luis Flores Ballesteros. Who's getting the worst of natural disasters?; 2008.
Available:<http://54pesos.org/2008/10/04/who-s-getting-the-worst-of-natural-disasters/>
10. Disaster Report 2013; 2014.
Available:<http://reliefweb.int/report/bangladesh/disaster-report-2013>
11. Biswas A, Rahman A, Mashreky SR, Humaira T, Dalal K. Rescue and emergency management of a man-made disaster: Lesson learnt from a collapse factory building, Bangladesh. *Sci World J* 2015;136434:8.
Available:<http://dx.doi.org/10.1155/2015/136434>
12. Huq NA, Dewan AM. Launch disasters in Bangladesh: A geographical study. *Geogr Malaysian J Soc Sp*. 2003;1:14–25.
Available:http://www.eoc.ukm.my/geografi/Artikel/Artikel-2003/Vol.1_Issue2_Naznin.pdf
13. Azad AK. Riverine passenger vessel disaster in Bangladesh: options for mitigation and safety Riverine Passenger Vessel Disaster in Bangladesh: Options for Mitigation and Safety. BRAC University; 2009.
Available:<http://dSPACE.bracu.ac.bd/bitstream/handle/10361/1395/08268023.PDF?sequence=1>
14. Iqbal KS, Bulian G, Hasegawa K, Karim MM, Awal ZI. A rational analysis of intact stability hazards involving small inland passenger ferries in Bangladesh. *J Mar Sci Technol*. 2008;13(3):270–81.

15. Karim M. Above 4,000 deaths from launch accidents in 38 years. Dhaka Trib; 2014. Available:<http://www.dhakatribune.com/bangladesh/2014/may/05/above-4000-deaths-launch-accidents-38-years>
16. Boyce C, Associate E. Conducting in-depth interviews: A guide for designing and conducting in-depth interviews. Evaluation. 2006;2:1–16. Available:http://www.cpc.unc.edu/measure/training/materials/data-quality-portuguese/m_e_tool_series_indepth_interviews.pdf
17. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today. Scotland. 2004;24(2):105–12.
18. Priest H, Roberts P, Woods L. An overview of three different approaches to the interpretation of qualitative data. Part 1: theoretical issues. Nurse Res. 2002;10(1): 30–42. Available:<http://search.ebscohost.com/login.aspx?direct=true&AuthType=cookie.ip.shib&db=rzh&AN=2003019858&site=ehost-live>
19. 41 killed in launch capsizes. Daily Star; 2015. Available:<http://epaper.thedailystar.net/index.php?opt=view&page=1&date=2015-02-23>
20. Bangladesh launches probe into deadly ferry sinking. ALJAZEERA; 2015. Available:<http://www.aljazeera.com/news/2015/02/bangladesh-launches-probe-deadly-ferry-sinking-150223173728117.html>
21. Disaster Incidences in Bangladesh. Nirapad; 2015. Available:http://reliefweb.int/sites/reliefweb.int/files/resources/Monthly_Disaster_Incidence_Report_February_2015.pdf
22. Death toll from Padma launch capsizes reaches 70. Daily Star; 2015. Available:<http://www.thedailystar.net/online/death-toll-padma-launch-capsizes-reaches-70-3493>
23. Wright L. Disaster turns spotlight on ferry safety in Bangladesh, Asia; 2014. Available:<http://www.dw.com/en/disaster-turns-spotlight-on-ferry-safety-in-bangladesh/a-1783207>
24. Loss of lives in launch capsizes continues. Risingbd.Com; 2015. Available:<http://www.risingbd.com/english/printnews.php?nssl=22751>
25. Adikari Y, Osti R, Noro T. Flood-related disaster vulnerability: An impending crisis of megacities in Asia. J Flood Risk Manag. 2010;3(3):185–91.
26. Waerebeek KV, Baker AN, Félix F, Gedamke J, Iñiguez M, Sanino GP, et al. Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Lat Am J Aquat Mamm. 2007;6(1):43–69.
27. Iqbal KS, Zakaria NMG, Hossain KA. Identifying and analysing underlying problems of shipbuilding industries in Bangladesh. 2010;41(2):147–58.

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