MOAS

Investigating fatal childhood drowning incidents in the Cox's Bazar refugee camps

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Contents

Abstract

Drowning is the second leading cause of childhood injury-related deaths worldwide and the most common cause of injury-related deaths among children under 5 years old. In Bangladesh, drowning has previously been identified as the leading cause of death among children aged 1 to 17. Efforts to reduce childhood drowning in Bangladesh have so far largely neglected the Rohingya refugee camps in Cox's Bazar district.

We investigated fatal drowning cases that occurred in the camps between January 2019 and December 2020, to explore the factors associated with drowning incidents and identify potential interventions. After learning of a fatal drowning, our field team visited key informants of the incident and conducted interviews with them. In total, twenty child drowning fatalities were recorded during the investigation period. The findings revealed that most drowning fatalities in the camps are associated with males, the rainy monsoon season, daylight hours, inadequate supervision, and occur in ponds. Fatal drowning incidents among children under 5 usually occurred as they fell into nearby unprotected water whilst caregivers were occupied with household duties. For school age children, fatal drowning incidents commonly occurred whilst playing or bathing in a water body without adult supervision and engaging in risky behaviours, primarily on breaks from or days without school or madrasa. COVID-19 related restrictions may have influenced an increase of drowning incidents among older children in 2020.

A drowning prevention programme specifically suited to the refugee camps is needed. Measures for children under 5 should focus on installing barriers to restrict access to water bodies and establishing community crèches to increase supervision. Interventions for older children should focus on teaching them basic swimming, water safety and safe rescue skills. These measures could be complemented by training bystanders in safe rescue and resuscitation, strengthening public awareness of drowning and highlighting the vulnerability of children. Despite certain limitations, this study succeeds in providing an insight into drowning risks in the camps and reveals opportunities for future research.

Introduction

Over the last decade, considerable progress has been made in reducing deaths from communicable diseases worldwide, yet in contrast, the number of injury-related deaths has progressively risen over the same period (Alonge et al, 2020; Liu et al, 2012). With an estimated 320,000 deaths due to drowning each year, fatal drowning is the world's third leading unintentional injury killer and a serious public health issue (WHO, 2016). The burden of drowning is disproportionately carried by populations in low and middle-income countries (LMICs), where over 90% of drowning incidents occur (Hyder et al, 2014). Drowning affects all groups, however, over half of all drowning deaths occur among those under 25 years of age (Rahman et al, 2019). Drowning is the second leading cause of childhood injury-related deaths globally and the most common cause of injury-related deaths among children under 5 years (WHO, 2013; Brenner, 2002). Fatal drowning rates among children in LMICs are six times higher than that of HICs (Rahman et al, 2017). In these countries, childhood drowning is regarded as a neglected topic, gaining little attention from policymakers and public health professionals, due to a lack of research, funding and understanding (Borse et al, 2011).

Bangladesh is a low-lying, riverine country located in South Asia, covering 147,570 square kilometres (Hossain et al, 2020). Water is a dominant feature of the landscape in Bangladesh, and the country's specific geographical and sociocultural factors make children particularly susceptible to drowning (Alonge et al, 2020; Gain et al. 2002; Ahmed et al. 1999). Most of the country is formed by the world's largest deltaic plain at the confluence of the Padma, Jamuna, and Meghna rivers and their tributaries, with ninety percent of Bangladesh's landmass being located on a floodplain (FAO, 2014; Gain et al, 2002). Bangladesh is a mainly pastoral low-income country in which most homes are located close to bodies of water (Hossain et al, 2015; Peden et al, 2008). Ponds, ditches, rivers, canals, and the ocean are used for daily household needs, agriculture, fishing, and transportation (Hossain et al, 2020). In rural areas, villages are usually surrounded and intersected by rivers and canals, whilst almost all homes have ponds that serve as water sources for household water, bathing, cooking, and providing water for animals, as they typically lack piped water supplies (Ahmed et al, 1999). Bangladesh is also highly disaster-prone, being vulnerable to water-related hazards including flooding, cyclones, extreme rainfall, and storm surges, which claim many lives every year as the capacity and resources to warn, evacuate or protect communities throughout the country are limited or in initial stages of development (Rahman et al, 2019; WHO; 2014; DDMB, 2013).

While there have been notable declines in child mortality in Bangladesh, largely due to decreases in infectious diseases (Baqui, 2001,1998), drowning mortality has remained constant, and continues to be a significant threat to child survival in the country (Rahman et al, 2017). In 2005, the first Bangladesh Health and Injury Survey (BHIS) was conducted, and the findings identified drowning as the leading cause of deaths among children aged 1-17 years old, with approximately 17,000 children losing their lives each year (Rahman et al, 2005). The BHIS was undertaken again in 2016, and the survey found drowning to be the main cause of injury deaths among children aged 1-4 and 5-9 years old (Rahman et al, 2016). According to the 2016 BHIS, 40 children (age 0-17) die due to drowning each day in the country. Factors consistently associated with childhood drowning in Bangladesh include male sex, age, rural residency, the rainy monsoon season, lack of physical barriers between people and water bodies, inadequate supervision, lack of water safety awareness, and risky behaviours (Rahman et al, 2017, 2009; Callaghan et al, 2010; Hyder et al, 2008, 2003; Ahmed et al. 1999). Most drowning deaths occur in natural water bodies, such as ponds, ditches, lakes, and rivers, which children commonly use for playing and bathing (Hossain et al, 2020; Rahman et al, 2005).

Although there is not yet a national childhood drowning prevention scheme in Bangladesh (Rahman et al, 2017), various studies and interventions have been undertaken throughout the country, particularly focusing on rural areas and children under 5 years old (Alonge et al, 2020; Callaghan et al, 2010). However, such research and actions have so far largely neglected the refugee camps hosting Rohingya refugees in Cox's Bazar, a region where drowning is the fourth highest cause of accidental death, according to the United Nations Development Programme (UNDP) in Bangladesh (2020). The Rohingya are a minority Muslim population from Myanmar that have faced statelessness and violence in the country's Rakhine State for decades, which has led to several waves of Rohingya fleeing to Bangladesh (Banerjee, 2019). The largest exodus began in August 2017, as more than 742,000 Rohingya fled to Bangladesh, the majority of whom sought sanctuary in Cox's Bazar District (Figure 1), the second poorest region in the country (Vince, 2020; UNHCR, 2019).

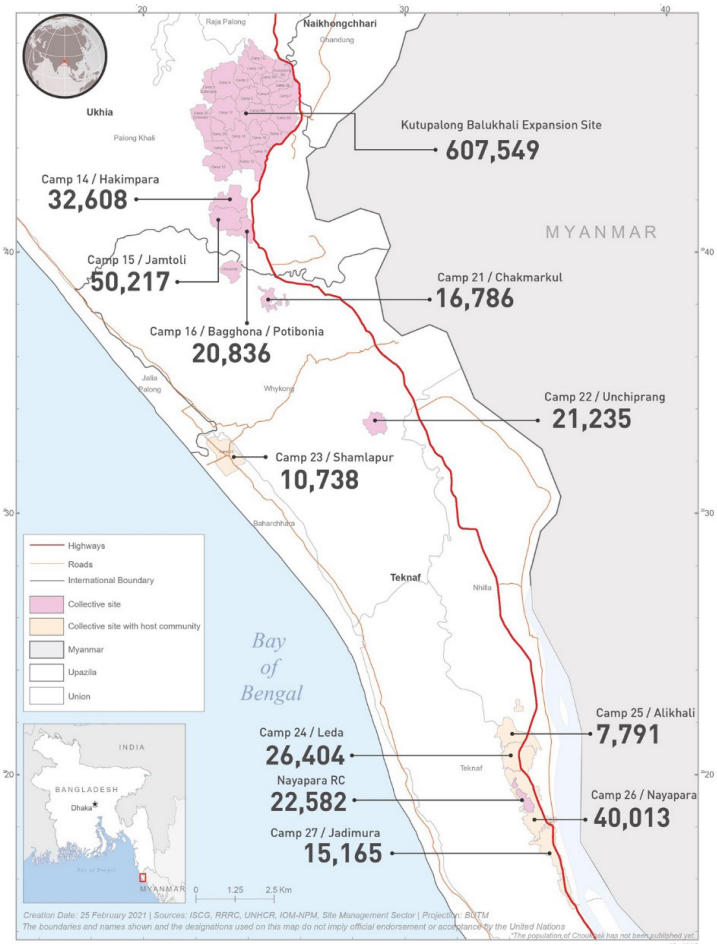

Figure 1. Map illustrating the geographical locations and populations of the Cox's Bazar refugee camps (ISCG Bangladesh, 2021).

Currently, there are approximately 877,000 displaced Rohingya residing in camps in the Ukhiya and Teknaf Upazilas of Cox's Bazar District (UNHCR, 2021). More than half of the refugees in the camp are children (Vince, 2020). There are thirty-four camps formally designated by the government of Bangladesh, including the two officially recognised camps, Kutupalong and Nayapara, as well as several camps supported by

agencies such as the International Organisation for Migration (IOM) and the UN Refugee Agency (UNHCR) (UNHCR, 2020; Banerjee, 2019; Milton et al, 2017). Along with existing challenges in addressing access to health services, food shortages and education needs (Pocock et al, 2017), the risks posed by water-related hazards for those living in the camps are high. Cox's Bazar is a district that is prone to floods, storm surges and the seasonal monsoon impact, whilst the refugee camps and their surrounding areas are highly susceptible to flash flooding and rainfall triggered landslides (Banerjee, 2019; Ahmed, 2015). The majority of Rohingya refugees are residing in temporary shelters built with plastic sheeting and bamboo, located in low-lying areas vulnerable to flooding (UNHCR, 2020; Ahmed et al, 2018). Access to water, sanitation, and hygiene (WASH) facilities is limited in the camps, which are served by few freshwater standpipes (Vince, 2020). Like for rural communities in Bangladesh, the bodies of water within and surrounding the camps such as ponds, canals and lakes are vital sources of water for daily household needs and bathing. They are also used for recreational activities by the camps' large child population.

As an international non-governmental organization (NGO) specialising in flood and water safety and working with Rohingya refugees and host communities in the region, we have gained an understanding of the drowning risks children living in the camps face and the devastating consequences. From our experience in the camps, we are aware of several incidents involving children under 5 years old drowning in unfenced water sources, such as ponds that are close to their shelters, as well as numerous fatal drowning incidents involving older children and adolescents that occur in ponds, as well as larger water bodies such as canals and reservoirs. In response to this, we have investigated fatal drowning cases that occurred in the refugee camps during the past two years, to further explore the influencing factors associated with the drowning incidents and possible interventions. We sent our field team into the camps to speak to the key informants of fatal drowning incidents that took place in 2019 and 2020 and to examine the water bodies in which the incidents occurred. The overall aim of this study is to investigate fatal childhood drowning incidents in the Cox's Bazar refugee camps in 2019 and 2020, explore the factors associated with their occurrence and discuss potential interventions.

Methods

The first stage of the investigation was identifying the child drowning fatalities that occurred in the refugee camps in Cox's Bazar. MOAS' field team used a combination of site management reports, observational data, and contact with site managers, emergency service volunteers and residents in the camps to acquire information on drowning incidents. Regarding drowning incidents in camps, we used the Needs and Population (NPM) platform, which tracks needs and vulnerability to inform the Rohingya humanitarian response in Cox's Bazar. However, drowning incidents were only added to the NPM's data collection in February 2020, therefore, observational data and local contact were critical for gaining information on drowning fatalities before this time.

For the purposes of this study, investigation of fatal child drowning cases was undertaken for the period January 2019 to December 2020. After learning of a drowning, a member of our field team would visit the key informants of the incident. These visits were undertaken to understand the contexts of the drowning incidents and the demographical characteristics of the victims. The key informants were primarily relatives of the victims, including parents and grandparents. Local knowledge and contact were essential for identifying and locating key informants. This was undertaken as quickly as possible, with visits often taking place within a week after the incident. During the visits, a member of our field team conducted open-ended semi-structured interviews with the key informants. A basic interview guide was developed to gather comparable forms of data (Bridges et al, 2008).

Contemporary notes were written during the interviews to document the details and accounts of the drowning incidents. When possible, the key informants took our researcher to the location of the drowning. In these instances, the field team member took photographs and wrote descriptive notes. The field notes collected during the interviews were subsequently analysed through thematic analysis. This involved identifying key themes in each account and coding the significant sections of the text. This was followed by construction of documents consisting of analysis notes and relevant quotes.

The cases investigated in this study were every fatal child drowning incident that MOAS learned of. However, we do not believe this to be all drowning deaths in the refugee camps during the study period, as there may be more fatalities that do not get officially reported. Therefore, it is currently difficult to determine an accurate drowning mortality rate in the refugee camps. Yet, as agencies including IOM and UNHCR are now collecting data on drowning incidents, more accurate and comprehensive datasets on drowning incidents are being constructed, which will enable further research into the issue. Furthermore, although this study may not be reporting every child drowning fatality in the camps, we believe that the cases investigated provide an insight into the drowning risks in the camps and the commonly occurring aspects of drowning incidents involving children.

Findings

In total, twenty child drowning fatalities were recorded in 2019 and 2020. Nine of these deaths occurred in 2019, whilst eleven took place in 2020. The ages of the victims ranged from 2 to 17 years old. Among the overall drowning fatalities, there were six (30%) fatalities to children 1-4, six (30%) fatalities to children 5-9, five fatalities (25%) to children 10-14, and one (5%) to children 15-17. (Figure 2). It is important to note that for two (10%) of the fatalities, key informants did not provide specific ages of the victims and were only able to confirm that they attended school. Fourteen (70%) of the victims were male and six (30%) were female (Figure 3).

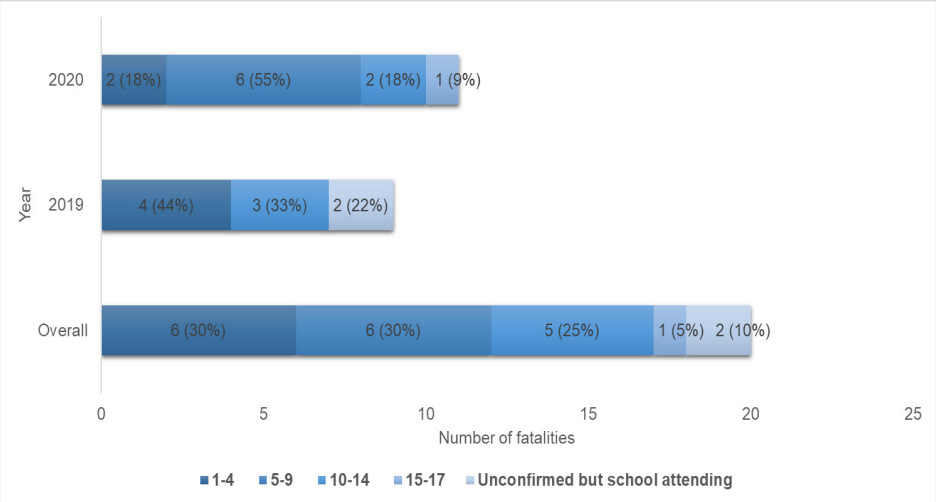

Figure 2. Age groups of fatalities recorded.

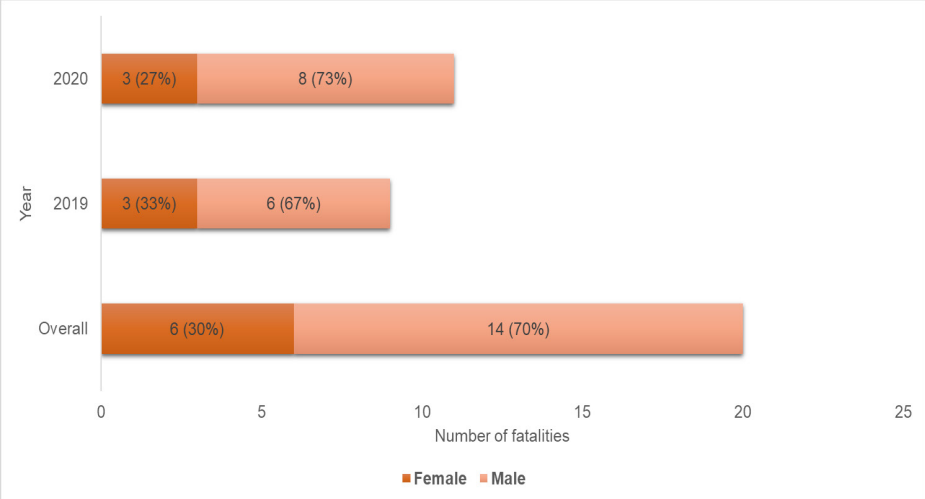

Figure 3. Sexes recorded.

Drowning deaths in the camps occurred year-round, however, the majority (80%) of the fatalities occurred during the rainy monsoon season between June and October (Figure 4). June and October individually were the months with the highest fatalities, with five being recorded in these months during the investigation period. Many of the fatalities occurred when the victims were alone or without adult supervision, and several key informants did not provide a specific time of day at which the drowning took place. However, from a combination of the time of the drownings when given and the narratives provided by the key informants, most fatalities took place during daylight hours, and the afternoon was the most common time for drownings to occur. This was especially found with school age children, whilst fatal drowning incidents among children under 5 were evenly spread among the morning (33%), afternoon (33%) and evening (33%). Three (15%) of the overall fatalities were specifically stated as occurring in the evening.

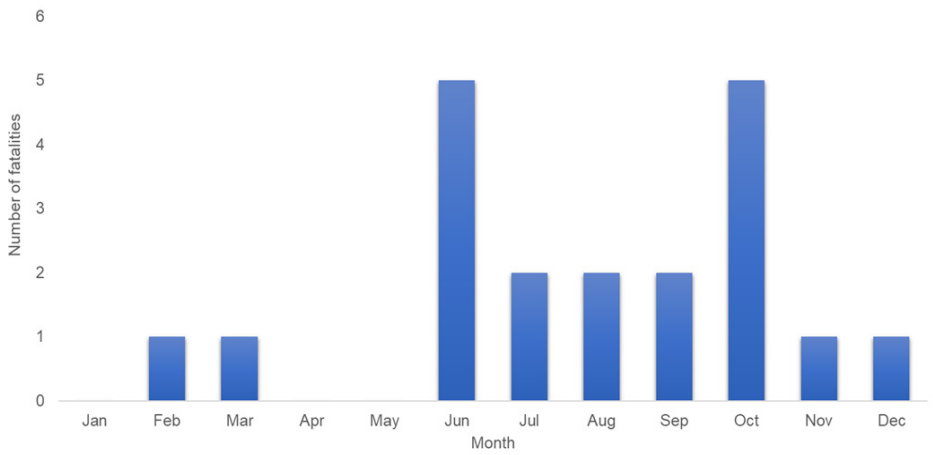

Figure 4. Months in which drowning fatalities were recorded during the study period.

Locations

Twelve (60%) of the fatalities occurred in ponds, three (15%) in canals, two (10%) in a deep hole that had accumulated rain, and one (5%) each in a lake, reservoir, and water bucket (Figure 5). Ponds were the most frequent drowning location. All but one of the fatalities to children under 5 occurred in unfenced ponds close to the victims' homes. Children over 5 years old and adolescents also drowned in ponds, yet these were commonly reported to be isolated or far away from the victim's home or camp. Two of the fatalities occurred at what was described by key informants as a pond, but upon examination by our field team, it was a deep hole that local people had dug for work uses. The hole had then accumulated a large amount of water during heavy rainfall and looked like a typical pond found in the camps but was much deeper. Canals were the second most common type of water body of where fatalities the took place. These fatalities were all school age children and adolescents. The accounts from the informants suggest that the canals presented difficult and unpredictable conditions, and deceptiveness in terms of water depth. The accounts also stated that the canals were used for multiple activities, as playing, bathing, and fishing were undertaken by the victims before they drowned. There was no recurrence of specific location of where the canal fatalities took place, as they occurred at Camp 27, Camp 8E and Camp 17. Two of the fatalities occurred at larger open water bodies described as a lake and a reservoir. Like the drownings

at canals, the fatalities that occurred at the lake and reservoir were school age children who got into difficulty as they went into deep water and submerged. There was also an individual incident in which a 2-year-old child drowned as she fell into an open water bucket inside her own home.

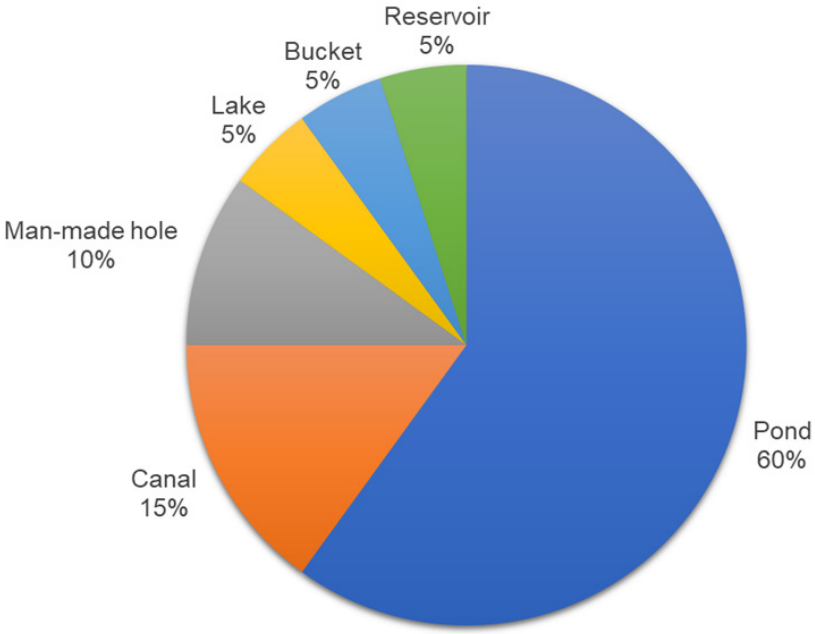

Figure 5. Bodies of water in which fatal drowning incidents occurred.

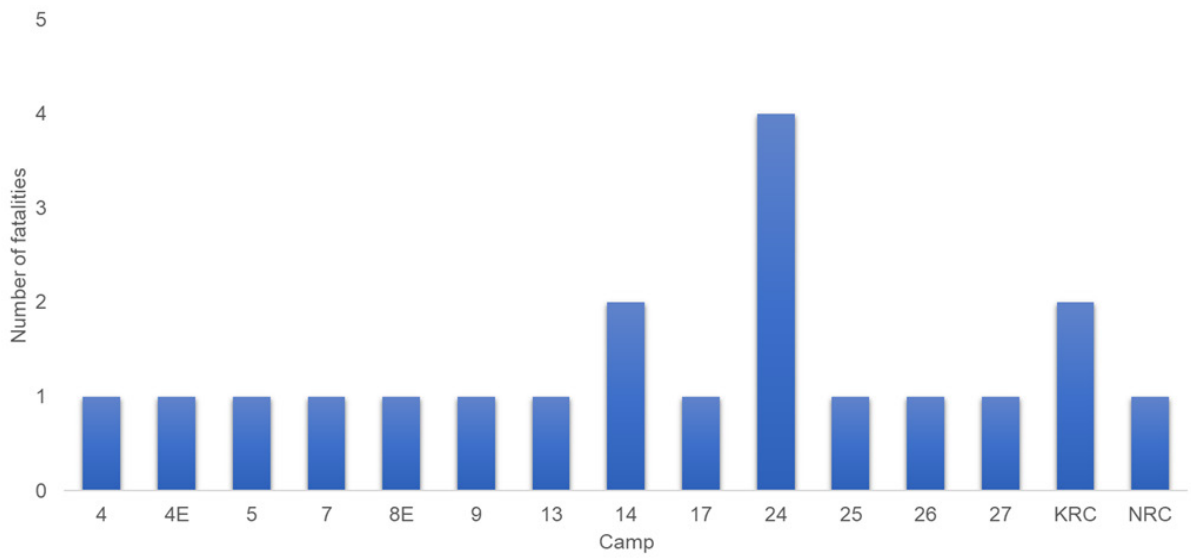

Figure 6. Refugee camps in which fatal drowning incidents occurred. KRC = Kutupalong Registered Camp and NRC = Nayapara Registered Camp.

The fatal drowning cases that were investigated occurred in fifteen different camps in Cox's Bazar (Figure 6). The camp with the highest number of fatalities was Camp 24, where four fatalities were recorded. All the fatalities that occurred in Camp 24 were children under 5 and involved a child being unsupervised as their parents were busy doing essential tasks and falling into ponds near their homes. Three of the fatalities in Camp 24 occurred in 2019, and one in 2020. A notable finding from the field accounts is that the family of the 2020 Camp 24 victim stated that prior to the incident they had asked the manager of the pond several times to build a fence around it, due to the drowning fatalities that occurred during the previous year. However, these requests were unanswered and the drowning risk for children in the vicinity of the pond remained high.

Social context

Half of the children died whilst with one or more friends of a similar age, whilst in nine (45%) cases of fatal drowning, the child was alone, and in an individual case of fatal drowning, the child was with an adult who was a relative. The social context in which the fatalities occurred varied between age groups. Amongst children under 5, the dominant theme was that the child was playing inside or around their family shelter. During this time, the victim's parents were undertaking essential household tasks such as preparing food, work, and prayer, which meant that the child was unsupervised and fell into nearby water bodies, or water sources inside their shelter.

The social contexts of the drowning incidents varied more with older children. Playing and bathing were the primary activities for why the children had gone to the body of water where they drowned. A common theme noted within accounts of fatal drowning among older children and adolescents was that they often occurred after the victim had just finished or was on a break from school or madrasa and went to play or bathe in water bodies, usually with peers and without adult supervision. Fatalities occurring on days when madrasa or school were off were also mentioned multiple times. Other recurring themes from the accounts were that older children engaged in behaviour such as going to water bodies described as far away from the victim's home, bathing in ponds alone, and victims deliberately disobeying their parents by going to forbidden water bodies.

Case study 1

Kabir was a 7-year-old boy who lived in Nayapara Registered Camp with his family. On a morning in June 2020, he left his shelter to go to madrasa. After finishing madrasa, he went to play outside with his friends. During this time, his father was sleeping, and his mother was busy with her housework. When Kabir's father woke up from his rest, his mother asked him where Kabir was and suggested he go out and get him. As his father was looking around the camp, he met some children and asked them if they had seen Kabir. They told him that he had been playing in the reservoir but had gone into deep water. Upon hearing this, Kabir's father immediately ran to the reservoir. When he arrived, bystanders had already pulled Kabir from the water and were attempting efforts to remove the water from his body. He was then rushed to hospital where the doctors confirmed that he had died.

**Name of the victim has been changed to protect their privacy.*

Response to drowning incident

The informants of the drowning incidents described how the victims' families responded to their child's absence or how those with their child at the incident responded. A common theme of the drowning fatalities for children under 5 is that once a parent had returned home or had finished their activity, they noticed the absence of their child and were unable to immediately find them. This was followed by the parents or a family member searching their home and the area around their shelter for their child, and then asking their neighbours. After a search period, the child was either found by a parent or bystander who then recovered the body. A similar sequence of events was noted with older children who had gone to a water body alone, as following the family of the victim noticing their absence, they undertook a long search period and either the family or bystanders recovered their body.

For older children with peers during their drowning incidents, there were various reoccurring scenarios. Firstly, a common theme found was that when the victim appeared in difficulty in the water or became submerged, their peers became frightened and ran away from the scene of the drowning to the family of the victim to inform them of the incident. Conversely, there were also multiple instances of the victim's peers running away from the incident and hiding what had happened, until the victim's family found them and obtained information from them. Two of the accounts mentioned family members informing volunteers of the Cyclone Preparedness Programme (CPP) about their missing child who then mobilised other volunteers to search for and recover the body of the victim. Several accounts mentioned the use of public speaker systems during the search period to spread information about a missing child. Whilst details of the immediate recovery of a victim's body are limited in the accounts provided, three of the cases involved a rescuer attempting some form of first aid or resuscitation attempt. Following recovery of their body, more than half of the victims (55%) were taken to hospital where they were assessed before being declared dead. Individual accounts also note of a victim being taken home and checked by a local doctor, as well as a victim's body being taken to the police station.

Case study 2

Sumaya was a 9-year-old girl living with her parents in Camp 8E. During the late morning at the end of August 2020, she decided to go with some friends of a similar age to a canal to play and bathe. While the children were playing in the canal, Sumaya suddenly got into difficulty in the water and became submerged.

The situation frightened her friends, and they were unable to assist and rescue her. They then ran away to her home to tell her family of the incident. Sumaya's relatives then rushed to the canal and pulled her body from the water. The family then brought her back to their shelter where a local doctor was summoned to assess her. However, the doctor declared Sumaya dead, leaving her parents devastated. Sumaya was reported to have epilepsy and her condition may have contributed to the incident.

**Name of the victim has been changed to protect their privacy.*

Pre-existing medical conditions

An important finding is that three of the fatalities in 2020 involved children that had epilepsy. Each of these victims were children over 5 years old. Two of these fatalities occurred as the victims had previously been playing with friends but had then gone alone to a pond described as far away. The remaining fatality to a child with epilepsy occurred as a school age child was playing with friends in a canal, and the key informants described of the victim 'failing in the water suddenly and her friends got very frightened'. These cases suggest that the victims may have had epileptic seizures that led to their drowning. However, without medical confirmation of a seizure, this is an assumption.

Discussion

This study shows that children living in the refugee camps are exposed to multiple drowning risks. Many of the risk factors found within this study correspond with previous investigations undertaken in Bangladesh and other LMICs (WHO, 2014). Firstly, fatal drowning among children in the camps was associated with males, with boys accounting for 70% of the fatalities investigated. This finding resembles existing research from Bangladesh, which has found fatal drowning to be strongly and significantly associated with males (Rahman et al, 2019). Higher drowning rates among boys have consistently been associated with increased activities outside the home, young boys being allowed to move more freely outside the household than girls, a greater propensity for risk taking behaviour and a higher exposure to risky situations (Croft and Button, 2015; Peden et al, 2008: Argan et al, 2003). In Bangladesh, researchers including Rahman et al (2019) have previously related this to cultural factors such as existing traditional gender roles, with young boys being more likely to be out playing unsupervised and young girls being more likely at home assisting with household activities and not being allowed to swim or bathe in public after a certain age (ADB, 2001). Considering the varying risks between young males and females found within the refugee camps, gender differences are key factors and need to be acknowledged when developing drowning prevention strategies (Borse et al, 2011).

In this study, fatal drowning among children occurred most frequently during the annual monsoon season (June to October); this finding supports prior studies that have consistently reported similar patterns of drowning fatalities during this period in Bangladesh (Rahman et al, 2012, 2009; Linnan et al, 2007). Researchers have highlighted that the Cox's Bazar refugee camps are highly prone to the impacts of the rainy monsoon season (Ahmed et al, 2018; Ahmed, 2015). Torrential monsoon rainfall can lead to floods and increased water levels in ponds, canals, ditches, and other water bodies in the camp, and consequently, create more dangerous conditions and increase the risks to children (Muhuri, 1996). Therefore, increasing awareness and knowledge of the elevated drowning risks during the monsoon season among the inhabitants of the refugee camps is important to incorporate into potential interventions.

Although the specific time at which the fatalities occurred are limited in our findings, drowning deaths among children in the refugee camps most frequently took place during daylight hours. This finding is in accordance with several previous studies conducted in Bangladesh, which have consistently found drowning rates to be highest during daylight hours (Rahman et al, 2019, 2017, 2009; Hossain et al, 2015). Within such studies, the high frequency of drowning incidents during daylight hours was suggested to be related to inadequate supervision, a factor that has been argued to underly most direct causes of childhood drowning (Petrass et al. 2011; Hyder et al. 2008; Fang et al. 2007). In this investigation, fatal drowning incidents were strongly associated with inadequate supervision. Fatalities among children under 5 occurred as the victims' caregivers were occupied with work or essential chores, whilst fatalities to older children commonly occurred during the afternoon, often during breaks from school or madrasa or just after school or madrasa had finished, being without adult supervision. This suggests that an expansion of active supervision of children could be a prevention strategy to consider for drowning in the refugee camps (Hyder et al. 2008). However, this measure may not address all the known risk factors for childhood drowning (Alonge et al, 2020), and considering the limited resources and large families in the camps, constant adult supervision may not be feasible.

The drowning environment in the camps revealed similarities to that of rural settings in Bangladesh and other LMICs (Figure 7). As within rural regions of Bangladesh, most shelters in the refugee camps are close to open water bodies, including ponds, ditches, and canals. These water bodies are used by children

for playing, bathing, and washing purposes, and are important sources of water for household needs, due to limited WASH facilities in the camps, such as a lack of freshwater standpipes (Akhter et al, 2020; Vince, 2020). This proximity and dependence on these open water sources creates an environment where children have frequent exposure to drowning risks and water-related hazards. Previous research conducted in Bangladesh has found reliance on accessing open water sources and frequent use of surface water rather than piped water to be associated with an increased risk of fatal drowning events (Jagnoor et al, 2019). Improving access to WASH infrastructure may, therefore, constitute a measure to reduce drowning hazards in the camps. In this investigation, ponds and canals were found to be the most common locations of drowning among the cases in the camps. This finding supports existing research which identified ponds as the most common location of fatal drowning among children throughout Bangladesh, and canals as a key secondary location (Rahman et al, 2017, 2009, 2005; Ahmed et al, 1999).

Figure 7. Common bodies of water in the refugee camps – canal, lake, and pond. Photographs taken by the MOAS research team.

The reoccurrence of children with epilepsy drowning in the camps is an important finding. Numerous researchers have highlighted the increased risks of drowning due to pre-existing medical conditions, and particular focus has been given to epilepsy (Bell et al, 2008; Besag, 2001). Previous studies from HICs have found that children with epilepsy are at a much higher risk of drowning and submersion than children who do not have epilepsy (Franklin et al, 2017; Diekema et al, 1993; Kemp and Sibert, 1993; Pearn et al, 1978). These risk factors are reportedly increased for children with poorly controlled epilepsy or associated learning difficulties (Kemp and Sibert, 1993). With this increased risk, a higher level of supervision has been suggested as a requirement for children with the condition, whilst increased awareness among caregivers and peers of the association between drowning and epilepsy should also be incorporated into drowning prevention programmes (Franklin et al, 2017).

The findings revealed a wide age range of drowning victims, with the youngest victim only 2 years old and the oldest victim 17 years old, demonstrating that fatal childhood drowning occurs throughout early childhood and into adolescence in the camps. The findings also revealed that the nature of fatal drowning incidents and influencing factors vary between children under 5 and older children. Among children below the age of 5, fatal drowning incidents primarily involved the victim being unsupervised as their parents or caregivers were preoccupied with daily domestic activities, including work, prayer and preparing food. With the child unsupervised, they were drawn to nearby unprotected water where they drowned. Their family or caregivers are often unaware of the drowning incident at the time it has occurred, and they are usually notified by neighbours and bystanders if they have not found their child themselves after a search period. This reoccurring scenario is one that has been frequently found in Bangladesh and other Asian LMIC settings (Linnan et al, 2012).

Case study 3

Sifat was a 2-year-old boy living with his parents in Camp 5. During an afternoon in October 2019, Sifat was playing outside his shelter. His mother was inside their home preparing some food and his father had gone to another camp to visit relatives. Whilst playing outside, Sifat wandered over to a pond close to his family's shelter and fell in. His parents were unaware that the incident had occurred. A young boy on his way home from school noticed that Sifat's body was in the pond and he quickly ran to inform his relatives. Upon hearing of the incident, Sifat's relatives immediately went to the pond to recover his body. However, Sifat was unresponsive and had already died.

**Name of the victim has been changed to protect their privacy.*

The prevalence of such drowning incidents is suggested to be related to various key influences. Firstly, preschool children have characteristics and behaviours that increase their risk of drowning, and prior studies have suggested that the high rates of drowning for children within age group may be related to developmental and behavioural factors, such as increased curiosity among toddlers, lack of sufficient dexterity and co-ordination, limited cognitive awareness of their surroundings and imperfect motor coordination (Celis et al, 2017; Rahman et al, 2017, 2009; WHO, 2014; Hyder et al, 2008; Zayas et al, 2007). In addition, children within this age group often have difficulties getting up upon falling, including into shallow water, because their centre of gravity is closer to their head (Zori and Schnaiderman, 2002). These developmental and behavioural factors are especially important to consider in an environment with many unprotected, open water bodies like the camps. A further key influence is suggested to be a lack of adequate supervision. Inadequate supervision was an underlying factor in each of the fatalities to children under 5. In these cases, caregivers were undertaking essential activities that caused distractions from direct child supervision, which led to an increased risk of the child drowning (Borse et al, 2011). The

association between inadequate supervision and drowning deaths among children under 5 has been highlighted in numerous previous studies, including research in Bangladesh which reported of inadequate supervision being associated with 70% of drowning deaths among this age group (Rahman et al, 2019; Petrass et al. 2011; Hyder et al. 2008; Fang et al. 2007; Warneke and Cooper, 1994; Coffman, 1991).

Among school age children and adolescents, fatal drowning incidents commonly occurred as the victims were playing or bathing in a water body far from their homes without adult supervision, engaging in risky behaviours, on breaks from or days without school, and either alone or with friends who did not have skills to rescue them. The cases of drowning among older children in this study demonstrated an association with risky behaviour, such as the child swimming in water alone, children going into deeper water, children going into larger and more dangerous water bodies, and going into water bodies that they have been forbidden from going to. This association resembles prior research which identified risky behaviour around water as an important risk factor that makes older children and teenagers, particularly teenage boys, especially vulnerable to drowning (Carl et al, 2001). Peden et al (2008) have suggested that older children who are comfortable in water or who perceive themselves to be good swimmers tend to seek out water-related activities, which might occur in more risky settings, such as in deeper water or at locations without appropriate supervision.

Among the cases of drowning among older children, there was a reoccurrence of children going into larger bodies of water and going into deeper water, either knowingly or unknowingly. Such situations suggest that poor awareness of water safety and perceived risk are key influences of fatal drowning among older children in the camps. This finding corresponds with previous research from LMICs, which found lack of water safety awareness and perceived risk to be important risk factors for drowning among children (Shen et al, 2017; Rahman et al, 2017; Laosee et al, 2014; Guevarra et al, 2010). Finally, older children and adolescents tend to be less supervised and be granted more independence, compared to children under 5 years old (Peden et al, 2008). With this increased independence, there is a possible greater exposure to open water during leisure time (Kriesfled and Henly, 2008; Peden et al, 2008; Linnan et al, 2007). This factor corresponds with the findings of this investigation, as drownings among older children and adolescents commonly occurred during the victims' break from madrasa or school, or on days when school and madrasa were off.

When comparing the fatalities recorded in the individual years of the study period, numerous similarities were found. In the findings from both 2019 and 2020, boys accounted for the majority of the fatal drowning victims, drowning incidents occurred most often in daylight hours during the months of the monsoon season, and ponds were the most frequent location of drowning. However, the fatalities recorded in 2020 demonstrated a shift in the age groups of the victims (Figure 8). The 2020 findings revealed a decrease in fatalities to children under 5 and an increase in fatalities among school age children and adolescents, consisting of the 5-9, 10-14 and 15-17 age groups. Four (44%) of the fatalities recorded in 2019 were children under 5 and five (56%) were school age children, whilst nine (82%) of the fatalities in 2020 were school age children and two (18%) of the fatalities in 2020 were children under 5. The most notable change concerned children 5-9, as there were six fatalities to children within this age group in 2020, compared to zero in 2019. The decrease in fatalities to children under 5 could have been influenced by efforts to build fences around the ponds in the refugee camps. Based on observational data, site management sources and communication with residents of the camps, over the last 18 months, fences had been erected around numerous ponds in the camps to mitigate the drowning risk for pre-school children. Consequently, such intervention may have reduced the frequency of unsupervised children accidentally falling into the pools. However, further investigation is required to confirm this link.

The increase in drowning incidents involving older children in 2020 may have been partly influenced by the COVID-19 situation and related measures. 2020 witnessed a substantial reduction in children attending schools and learning centres because of COVID-19 restrictions. On 16 March 2020, the Bangladesh government closed all schools, including the refugee camps' learning centres and community centres (Vince, 2020). From this time onwards, 315,000 Rohingya refugee children and adolescents were unable to attend their learning centres (UNICEF, 2020a). Children will have had more unstructured free time and would have been searching for activities and entertainment. This may have increased the frequency of children playing and bathing in ponds, reservoirs, and canals, and consequently, heightened their exposure to drowning risks.

UNICEF (2020b) have previously identified the association between the impact of COVID-19 restrictions and increased dangers and injuries for children living in the refugee camps in Cox's Bazar. In their report on child protection risks during the pandemic, UNICEF highlighted that parents and caregivers in the camps were facing increased challenges to supervise children, with education and child protection facilities being closed, along with additional pressures to care for whole families including elderly family members. As a result of these factors, increased numbers of children were straying from home and experiencing harmful injuries due to incidents including drowning (UNICEF, 2020b). Such circumstances may have influenced the 2020 fatalities investigated in this study.

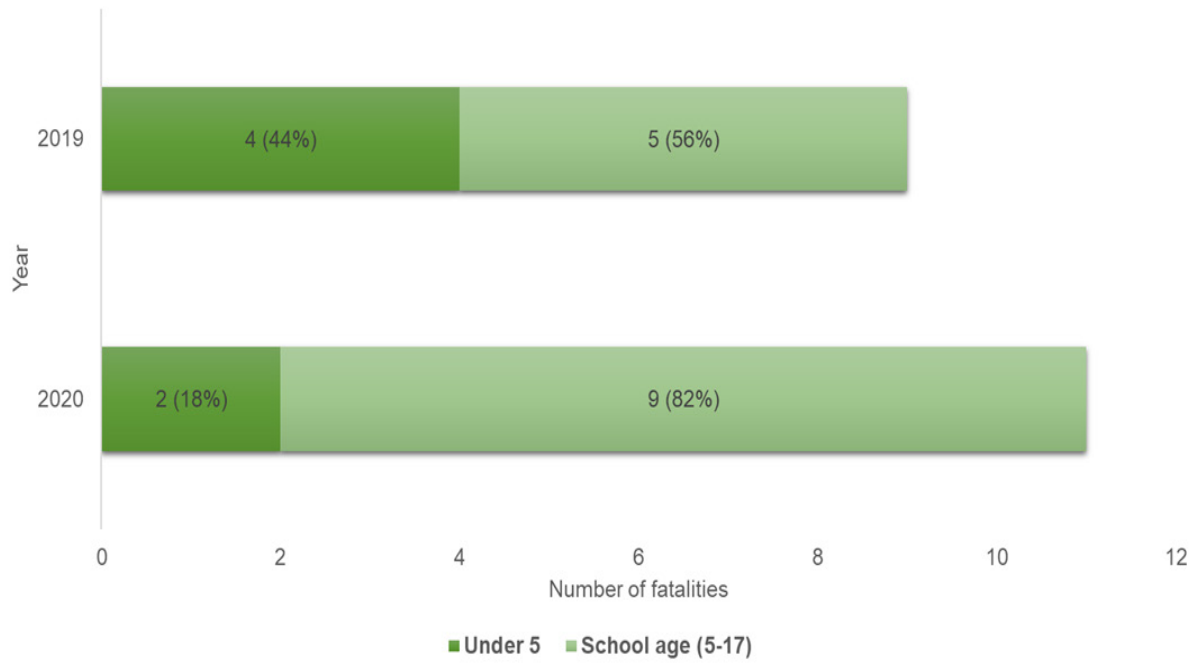

Figure 8. Fatalities to children under 5 years old and school age children recorded in 2019 and 2020.

Implications

The findings demonstrate that childhood drowning is a grave issue in the refugee camps that requires urgent intervention. Many cases of fatal drowning among children can be prevented through sustained and comprehensive efforts to implement safety intervention (Peden et al, 2008). Although there are many proven drowning prevention strategies, several factors must be considered for the suitability and feasibility of their implementation in the refugee camps.

Preventative measures must be realistic and practical for the low resource setting of the refugee camps located in an LMIC and consider local environmental and social contextual factors to ensure viability and acceptability (Gupta et al, 2020). Issues such as insufficient funds, lack of technical capacity, and limited coordination among stakeholders and implementers are key challenges to implementing drowning prevention interventions in low resource settings such as refugee camps (Hyder et al, 2014a). Many existing child drowning prevention measures, such as lifeguards, swimming instruction and supervision strategies have been developed in HICs (Cummings et al, 2011; Hyder et al, 2008; Quan et al, 2007; Brenner, 2002). However, such measures may not all be appropriate for reducing the number of drowning deaths in the refugee camps, as interventions established in HIC settings are often not directly transferrable or applicable to LMICs (Hyder et al, 2014a, 2008; Mecrow and Suvanprakorn, 2014). HICs and LMICs have varying geographical, social, cultural, and behavioural factors associated with drowning, which often make it unfeasible and unrealistic to apply existing prevention strategies directly in LMIC settings (Lu et al, 2010; Hyder et al, 2008; Sethi and Zwi, 1998).

Along with locational and resource considerations, potential prevention strategies and measures to mitigate drowning risks should be appropriate to the child's developmental stage to maximize their effectiveness (Peden et al, 2008). Different interventions are required for different age groups. Previous studies have suggested that drowning prevention interventions for children under 5 should focus on supervision, the home environment, and awareness and knowledge levels of parents and caregivers (Linnan et al, 2012). Therefore, for children under 5, environmental modifications such as fencing of water bodies, use of door-barriers or playpens, enhanced supervision of children and the wearing of personal protective devices have been advocated for drowning prevention in LMICs (WHO, 2014; Peden at, 2008). Constructing fences could be a key measure for limiting access to smaller water bodies in the camps, particularly ponds, for children under 5. The potential effectiveness of erecting fences around ponds in the camps was insinuated in the findings, as following efforts to fences numerous ponds in the camps (Figure 9), a decrease in fatalities to children under 5 was recorded. Yet, further research is required to confirm this relationship and assess the effectiveness of the fences in the camps.

Interventions to prevent access to smaller water sources including buckets is also required, as a water bucket was a location of drowning to a 2-year-old child. Due to limitations in water accessibility in the camps, buckets are particularly important for the provision and storage of water. Therefore, commonly advocated prevention measures such as promoting leaving buckets empty when not in use may not be applicable in the refugee camps where they are in constant use (Celis et al, 2017). A more suitable measure may be to cover open buckets with a lid, as this has been proven to be an effective measure to prevent children from falling and drowning in buckets (Celis et al, 2017). According to site management sources and observational data, most buckets used in the camps are those designed by Oxfam, which are distributed with lids. However, the case investigated in this study suggests that these lids are not always

used appropriately. Consequently, highlighting the significance of using lids and covering smaller water sources could be a key factor to incorporate into a drowning prevention programme for the camps, featuring as a component of strengthening public awareness of drowning.

Figure 9. A newly constructed fence in the refugee camps, built to prevent young children accessing the pond. Photograph taken by the research team.

Enhancing adult supervision through providing children with capable childcare is also advocated for preventing drowning among children under 5 in LMICs (WHO, 2014). In Bangladesh, the use of community crèches to heighten adequate supervision has been reported to be an effective drowning prevention measure among preschool children in low resource rural areas (Alonge et al, 2020; Rahman et al, 2012). For example, the Anchal programme, formally launched in the Barishal Division in 2017, has been found to protect children from drowning through the provision of community-based crèches where children aged 1–5 are cared for within a supervised, protected environment (Gupta et al, 2021, 2019). In addition to providing capable supervision during the peak hours when drownings occur in Bangladesh (between 9am and 1 pm), crèches also include activities that stimulate the development of cognitive and motor skills of the enrolled children (Hyder et al, 2014b). Consequently, community-led crèche interventions are suggested to be effective at reducing drowning deaths among preschool children in low resource settings in Bangladesh and should be considered for implementation in the refugee camps in Cox's Bazar.

For older children and adolescents, interventions should focus on the children themselves, as most drowning incidents to children within this age range are associated with increased independence, low supervision, and risk-taking behaviours. Therefore, preventative strategies for older children and adolescents should focus on increasing a child's personal cognitive skills around water including better recognition of hazards, recognition of personal limits, and to the ability to resist peer pressure to take part in activities for which skills are lacking (Peden et al, 2008). This can be realised through teaching children within this age group basic swimming, water safety and safe rescue skills. This is a key drowning prevention strategy advocated by WHO (2014), and its effectiveness is supported by studies of programmes

conducted in Bangladesh, China, Thailand, Vietnam, and Grenada (Solomon et al, 2012; Rahman et al, 2012). This form of action has seen successful implementation in Bangladesh through SwimSafe, a basic swimming, non-contact rescue and water safety programme developed for the low resource environments of LMICs. Children are taught safe rescue using non-contact, land-based reach and throw techniques, and are instructed to only to enter the water as a last resort. In Bangladesh, the SwimSafe programme has been taught to over 400,000 children 4-12 years old since 2006 (Mecrow et al, 2015), and has shown to be effective in preventing drowning (Chowdhury et al, 2018; Talab et al, 2016; Rahman et al, 2012). However, despite evidence for its effectiveness, several aspects of this programme may not be feasible in the refugee camp context. This is due to firstly financial restrictions, as although some researchers regard SwimSafe as highly cost-effective, (WHO, 2014; Rahman et al, 2012), the funding demands may still be too great for implementation in the camps. The programme is also reliant on safe swimming venues. However, these are non-existent in the camps. While there are numerous open water bodies in the camps and surrounding areas, due to factors such as poor water quality and other safety concerns that could risk the health and wellbeing of both instructors and participants, they cannot be considered suitable for this type of training. This could potentially be rectified by constructing portable or temporary swimming pools, yet such facilities are very expensive, further rendering this form of training unrealistic. Therefore, further consideration and research into the technical aspects and budgetary requirements of a water safety training programme for older children in the camps is needed.

In addition to intervention aimed at the different age groups of children, prevention strategies should also include measures targeted to the community in the refugee camps. This can include strengthening public awareness and highlighting the vulnerability of children (WHO, 2014), and should incorporate parents and caregivers, as well as members of the wider community. Researchers in Bangladesh have previously suggested that increasing knowledge and awareness about childhood drowning is key measure that should be incorporated into drowning prevention programmes in the country (Hossain et al, 2015), and this strategy should be extended to the refugee camps. The International Drowning Research Centre in Bangladesh (IDRC-B) have previously undertaken social autopsy programmes as a drowning prevention strategy targeted at the community (IDRC-B, 2008). Within these programmes, IDRC-B staff visit communities where drowning deaths have occurred and discuss why it happened and how the community can reduce risks. The risk of drowning is frequently underestimated, and people often are unaware of who is particularly at risk (Linnan et al, 2007), therefore, elevating public awareness through measures such as social autopsy programmes could be a major step in preventing drowning deaths in the camps.

A further measure focused on the community level is training bystanders in safe rescue and resuscitation (WHO, 2014), as the role and immediate action of bystanders makes a critical difference in the survival of drowning victims (Venema et al, 2010; Peden et al, 2008). The findings of this study revealed that only 15% of fatal drowning cases investigated involved a bystander attempting some form of first aid or resuscitation. In these cases, the informants described of a rescuing bystander 'trying hard to remove the water from the victim's body.' These findings suggest a low level of awareness of effective first aid and resuscitation practices, and the methods incorrectly used resembled traditional rescue techniques found in previous studies in Bangladesh, which have been often found to be counterproductive and reduce chances of survival (Borse et al, 2011; IDRC-B, 2008). However, many key informants interviewed were not immediately present at the drowning incident they were reporting, therefore, information on the specific attempts or techniques used is limited in these findings. Nevertheless, prior studies have found that in cases of drowning, most lives are saved by the immediate action of bystanders at the scene, either lay people or professional rescuers (Peden et al, 2008). Therefore, increasing the skills and knowledge of safe water rescue and resuscitation techniques should also be a focus of community-based awareness expansion and a key part of a drowning prevention programme designed for the camps. Enhancing the education of safe water rescue skills among the community is a measure currently being implemented in

the refugee camps in Cox's Bazar through the ongoing Flood and Water Safety Training initiative, which is being supported by MOAS in coordination with the national Cyclone Preparedness Programme. Through the training, Rohingya refugees, as well as host community members are trained to function as first responders in the event of a water-related emergency and are provided with a throw bag to undertake first response water rescues. As the training has only been implemented in the camps over the last few years, long-term comprehensive data to demonstrate its effectiveness is unavailable and further research is required. Yet, NGOs operating in the camps have reported of positive outcomes and children's lives being saved by rescue techniques taught through the programme.

This study has limitations. Firstly, a limitation of the data acquired through the interviews is that the sample used was collected through non-probability sampling methods and were small. Therefore, the sample of drowning victims in this study cannot be considered fully representative and consequently, limits the extent to which the findings can be generalized. As previously stated, the drowning deaths investigated in this study are not believed to be all the child drowning deaths that occurred in the camps in 2019 and 2020. This restricts the ability to compare the scale of childhood drowning with other causes of death, injury or illness among children living in the refugee camps. This study focused solely on fatal drowning cases, however, based on information provided by site management and local contacts in the camps, numerous non-fatal drowning incidents also occur. By excluding these cases, relevant data and information on the extent and associated risks of drowning among children may not have been collected. Therefore, a future study could rectify this by investigating both fatal and non-fatal drowning cases. In certain interviews with key informants, vital information regarding the demographic characteristics of the victims and the circumstances of the drowning incidents were not included. This restricted the ability to make consistent and thorough comparisons between the findings and limits the conclusions made. However, this is due to some drowning deaths taking place when the child was alone, as well as issues relating to key informants, primarily relatives of the victims, being uncomfortable providing certain information to our researchers, given the sensitivity of the subject.

Conclusion

Over the past two decades, it has become increasingly recognised that drowning is a major public health issue in Bangladesh and a critical threat to the survival of children in the country. This investigation has revealed that this threat extends to the young Rohingya living in the refugee camps in Cox's Bazar. The findings of this study revealed that most drowning fatalities in the camps are associated with males, the rainy monsoon season, daylight hours, inadequate supervision, whilst most commonly taking place in ponds. The findings also demonstrated that the nature of fatal drowning incidents in the camps can vary with age. Fatal drowning incidents among children under 5 years old primarily occurred as they were drawn to nearby unprotected water sources as their parents or caregivers were preoccupied with essential activities. For older children, fatal drowning incidents commonly occurred as the children involved were playing or bathing in a water body without adult supervision and engaging in risky behaviours, primarily on breaks from or days without school or madrasa. In addition, the findings also suggested that COVID-19 related restrictions may have influenced the frequency of drowning incidents among older children in 2020. The closure of learning centres may have amplified challenges to maintaining adequate adult supervision and presented school age children with more unstructured free time and opportunities to bathe or play in water bodies.

Considering this exposure to drowning risks, there is a crucial need to design and implement a drowning prevention programme specifically suited to the environment and population of the refugee camps. Given the differing risks associated with age groups, and the importance of the wider community's awareness and rescue skills, a holistic approach to drowning prevention is required. Drowning prevention strategies for children under 5 should focus on strategically placing barriers to restrict access to open water sources, such as fences, doors barriers and playpens. Supervision issues among preschool children could potentially be alleviated through the establishment of community crèches. For older children, intervention and action could focus on teaching school age children basic swimming, water safety and safe rescue skills. These age-focused measures could be complemented by training bystanders in safe rescue and resuscitation, strengthening public awareness of drowning and highlighting the vulnerability of children. Each of these measures have proven effective in low resource LMIC settings and are, therefore, advocated for preventing childhood drowning in the refugee camps. However, such measures have yet to be specifically applied in refugee camp settings, and funding and resource constraints may impede the potential for their implementation.

Despite certain limitations, this study succeeds in providing a key insight into the drowning risks in the camps and reveals opportunities for future research. Until recently, issues including reporting drowning incidents have been side-lined as necessities such as providing adequate food, WASH, shelter and medical services and infrastructure have had to take precedence. However, given the growing recognition of the drowning risks, site managers and agencies working in the camps are now granting increased attention to this issue and documenting drowning incidents more thoroughly. From this point forwards, there is a responsibility for such stakeholders to collaborate and make use of this information to conduct more comprehensive research of the drowning incidents occurring in the camps and assess and implement appropriate forms of intervention.

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