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Community perception of childhood drowning and prevention in a semi-urban district of Cambodia: A qualitative study

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Abstract

Background: Drowning is a leading cause of mortality for low and middle-income countries (LMICs). Recent studies in Cambodia have shown children to be particularly vulnerable to drowning death. Cambodia has no formal drowning prevention programmes at this time and no known qualitative studies on drowning and prevention.

Objectives: 1) To explore perception of drowning and prevention in a semi-urban Cambodian community. 2) To explore community understanding of drowning danger in the locality and investigate the risk factors relating to childhood in this peri-urban population. 3) To understand the cultural beliefs surrounding drowning and assess existing knowledge and prevention practice in this peri-urban population.

Methods: Four focus group discussions were conducted in the Mean Chey district of Phnom Penh, Cambodia. The groups were organised into younger females, younger males, older males and older females.

Results: Childhood drowning (fatal and non-fatal) was considered to be a significant issue. Participants shared understanding of different drowning risks in the locality and told eyewitness accounts of drowning incidents including involvement in rescue attempts. Risk factors are inherent to the children and their caretakers; hazards are inherent to the environment. Close proximity to large bodies of water was one risk factor. Another was lack of adult supervision. Participants spoke of existing prevention practice where resources were limited. They gave new ideas for drowning prevention, which included water safety education swimming instruction and safer areas for children to play and swim.

Conclusion: This peri-urban community identified the need for assistance in the ability to prevent childhood drowning. A feasibility study may be appropriate for the provision of water safety education and swimming instruction with designated safe areas for children to play and swim as well as safe rescue training. This community will benefit from the provision of these life saving interventions.

Introduction

Drowning is defined as 'the process of respiratory impairment from submersion in liquid' with drowning outcomes categorised as morbidity, no morbidity or death.¹ Drowning is not yet recognised as a significant public health concern in South and Southeast Asia² despite studies in the region, which identified drowning as a leading cause of death for 1 to 15 year olds. ^{3,4,5} In Cambodia, the 2007 Accident and Injury Survey found drowning to be the single leading cause of child mortality after infancy with 65% of drowning deaths occurring in children aged 5 or younger with a peak of fatal drowning rates in children aged 2 years. This study also estimated that a child dies from drowning every 4.7 hours. ⁶ Lack of formal death registration and facility biases in low and middle-income countries (LMICs) lead to fatal drowning being under-estimated. ⁷⁻⁸

Cambodia is the focus for this qualitative study, designed to understand community perceptions of drowning in a peri-urban environment near the capital, Phnom Penh. The majority of people living in Cambodia are Khmer who make up 90% of the population with ethnic minorities including Vietnamese, Cham and Chinese people.⁹ Despite outside investment and recent economic growth,¹⁰ Cambodia remains a low-income country (LIC) slow to recover following the US bombing during the Vietnam War¹¹ and genocide implemented by the Khmer Rouge.¹² The country has rebuilt a large proportion of the public health infrastructure as evidenced by a considerable reduction in the incidence and prevalence of HIV.¹³ However, poverty remains high at 35% and those in extreme poverty at 15% with higher mortality rates in comparison to the majority of East Asia¹⁴ with an under-5 mortality rate of 51 per 1,000 live births in 2012.¹⁵

Studies on community perception of drowning in Asia have recently included Rahman et al. Bangladesh study, which highlighted local knowledge of the places where children had commonly drowned. ¹⁶ Unprotected bodies of water were also perceived to be a reason for high rates of child mortality in South India according to Isaac at al. ¹⁷ These studies have been helpful in understanding a local community's belief and response to drowning which can assist in informing appropriate prevention measures.

Drowning prevention programmes are common in high-income countries (HIC) and have resulted in dramatically lowering drowning rates in children over the last 50 years.¹⁸ These reductions have been attributed to a combination of prevention measures including zoning and other regulations, pool fencing and improved caretaker supervision as a result of extensive awareness campaigns.^{19,20,21} For children 5 years and over, swimming ability has been associated with protection from drowning.²² However, The Cambodia Accident and Injury Survey (CAIS) revealed that many of the children aged 4 years or more, did not have swimming ability.²³ Despite a growing awareness that drowning is a leading cause of child death, drowning prevention is not yet a priority for the national public health agenda. In order to develop appropriate and effective interventions it will be important to understand community perception of drowning and norms of knowledge and attitudes relating to drowning. Exploring local knowledge and ideas in a participatory manner can increase a sense of ownership as well as gauge barriers to prevention measures increasing the sustainability of a project.²⁴ It is important to understand existing drowning prevention practice within a resource-poor setting and how the community perceive its limitations.

The aim of this study is to explore community perception around drowning and prevention in a peri-urban location nearby the capital of Cambodia. The objectives are, to gain a deeper understanding of the perceived dangers and risk factors in the location, to explore who is most vulnerable, to ascertain the bodies of water considered most dangerous and to discover the beliefs held around drowning and drowning deaths in this particular locale in Cambodia.

Methods

Focus group discussions (FGD) were conducted with Mean Chey district residents who comprised of health service users and ex-service users. Ten participants were organised for each focus group, which were gathered into 4 groups, 2 male groups (between ages 16 - 62) and 2 female groups (between ages 16-69). From a total of 40 participants, 50% were female. All participants recruited spoke Khmer although this was not a prerequisite. No one was excluded from joining. Every participant completed a brief demographic questionnaire documenting sex, age, occupation, ethnicity and religious belief. Questions used were similar to those in studies by Rahman et al.¹⁶ and Isaac et al.¹⁷ The questions were developed by the principal investigator in English and translated by a Cambodian facilitator into Khmer. Participants were asked a set of questions about childhood drowning, risks factors, belief, response and prevention in the locality. A child was defined as being below18 years of age. All drowning events described were detailed as fatal, non-fatal or unknown. Drowning events were classified according to fatal, non-fatal and unknown outcomes. A map of Mean Chey, (Figure 1), was shown to participants who were asked to mark their home in black and mark in red the location perceived as most dangerous for drowning. A new map was used with each group. Thematic content analysis of data was completed using computer software and manual methods. Access to counselling was made available to all participants.



Figure 1. Map of Mean Chey combined from the four FGDs. Places of residence and places considered most dangerous for drowning.

Results

Table 1 shows, the participants' ethnicity was Khmer (N= 37) and Cham (N=3). Ages ranged from 16 to 69 years and participants had a variety of livelihoods. Participants from all groups emphasised drowning as *big* or *very big problem* for their community. Table 2 shows 23 accounts of childhood drowning deaths, which included direct witness and word-of mouth accounts. Participants recalled involvement in 15 successful rescue attempts and 4 unsuccessful. Three accounts of Aquatic Victim-Instead of Rescuer syndrome were recalled (AVIR- where a person drowns in the attempted rescue of another ²⁵), resulting in 6 drowning deaths in 3 rescue attempts. Two participants were subsequently referred to for counselling.

Participants	Number	Age Range (years)	
Female group 1 High School students (10)	10	16 - 18	
Male Group 1 High School students (8) University student (1) Mechanic (1)	10	16 – 23	
Female Group 2 Caregiver (1) Caregiver of grandchildren (1) Caregiver of disabled children (1) Vegetable Seller (2) Cement Labourer (1) Coin healer (1)* Cake maker, seller (1) Cooked food seller (1)	10	21 – 69	
Male Group 2 Recycle Person (1) Motorbike taxi driver (2) Student (1) Builder (2) Fisherman (1) Policeman (2) Farmer (1)	10	19 – 62	

TABLE 1: Participant demographics	
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Ethnicity: 37 Khmer and 3 Cham. *Traditional healer Religious belief: 27 Buddhist, 10 Christian and 3 Muslim.

Drowning death accounts	Children
Direct witness	8
Word-of-mouth	15
Total	23
Successful rescue attempts:	
Direct involvement	15 (Participant rescuer: Male 10, Female 5)
Word-of-mouth	2
Total	17
Unsuccessful rescue attempts:	
Direct involvement	4
Word-of-mouth	6
Total	10
Aquatic victim-instead of rescuer syndrome (AVIR) ²⁵ account	e 3 (6 died in 3 rescue attempts)
All drowning accounts included were limite	ed to the last 5 years.

TABLE 2: Numbers of drowning death and rescue accounts given by participants in FGDs

Risk factors

The majority of participants (97%) believed that boys were most at risk of drowning than girls, as they were more daring, adventurous and active. *The boys love to play in the river and the fast flowing streams*. Many participants had seen boys fatally drown or had heard this from their community. Approximately of 62% of participants believed it was children under 10 who were most likely to drown. The younger female group (25%) understood that drowning most occurred in children aged less than 5 years. Deep water was considered more dangerous for children of all ages and small water containers a particular risk for younger, smaller children. Household sewers with no cover or easily removable covers were reported as a drowning risk as children had been reported falling in. Some participants were aware that

young children could drown in just a few centimetres of water and saw particular vulnerability around water jars, seen in Figure 2, and buckets. *There was a little child playing in the house. His mother was cooking; the boy went to the back of the house. He saw the hips of his sister in the bucket, her face in the water. He ran very quickly saying, "My sister is inside the bucket!" The older brother ran very quickly to save his daughter. He tried to save her for many hours, a long time but she was already dead.* It was thought that children who had died had sometimes gone headfirst in the attempt to reach objects dropped inside.



Figure 2. Water jar with cover.

Environment - Water all around

Participants perceived that close proximity to large bodies of water was a significant risk factor for childhood drowning. Each participant marked on the map of Mean Chey, the location of their home and the place they believed most hazardous for drowning, as seen in Figure 1. The map shows the majority of participants lived less than 200 meters away from perceived drowning danger. Annual flooding was a particular concern to participants. Flooding occurred for up to five months beginning around August with river water levels decreasing in December. Local radio stations, village chiefs and elders gave flood warnings asking people to make preparations. All groups perceived this time was when drowning was most likely to occur. Some participants' families were living in flooded houses with water levels up to the chest, approximately 1.2 metres in depth. Some participants lived on land between lakes, which flooded for 3 to 5 months every year. Other participants lived in homes, which had been situated on the riverbank but had since been taken up by the river. Example seen in Figure 3. During times of flooding, the river water was thought to flow faster during the afternoon. Participants emphasised this as being a particular risk to childhood drowning where houses were damaged or completely torn down from the strength of the water. In other cases, submerged homes had forced participants and their families to move home or to go and live at the local Pagoda with water all around. Parents, carers and siblings from each group spoke of their anxiety of caring for children around so much water. We're also faced with a problem with our children. We have to keep our eyes on them. If they're asleep it's OK, but awake they want to play, so we have to be very careful. I have to try and keep awake all night sometimes to make sure they don't fall in.

My younger brother sleepwalks. My house has got lots of water, flooded. He sleeps in the daytime and wakes up in the night. He grabs his pillow and goes into the water. His friend goes after him and grabs him by the hair back out of the water and he wakes up.

Participants, particularly the mothers, indicated a huge weight of responsibility during flood times which included struggling with loss of income, difficulties traveling in water whilst concerned about children drowning. As one participant explained, *Most of the people live close together. Every year our place floods. Even now I am here, I am worried for my children, but they are staying with my relatives. They love to play in the water every day. I think every family is forced with a difficulty when it floods. For no one it's easy, very difficult.*



Figure 3. Houses in the Bassac River and children playing (near to the Monivong Bridge).

Participants discussed local places and bodies of water where drowning was known to occur. These included *the rivers, floodwater, lakes, industrial places, water jars, buckets, sewers, bridge walkways* and *water platforms*. Activities in the river associated with drowning were reported to be playing, swimming, washing clothes, toileting and bathing. *Some of them play too close to the river. The land slides into the fast flowing river and they drown*. Participants also reported children and adults falling into the water from *boats, riverbanks* and *subsided riverbanks*. Lake activities, which led to drowning, included *boat* travel; *fishing for income, picking morning glory leaves to sell* and hobby *fishing*. Stories of children falling through *broken bridge walkways* and *platforms* were highlighted in the FGDs. *I saw a lot of children drown*. *Some of them we could save, some we couldn't*. A bridge walkway is seen in Figure 4. *A lot of children like to play on the wooden platforms near the river*. *One child he runs and the wood breaks. The platform fills with water. So not easy to save him as it was covered in water. We tried to save him. We found that he was dead already.*



Figure 4. Bridge walkway on the edge of the Bassac River

The majority of participants agreed that the river had the highest risk for drowning deaths in children of all ages; particularly children aged over five who play independently of their caregivers. *Most of the children they love to play in the water*. Participants reported the Bassac River as an area of particular drowning danger shown on the map in Figure 1, especially where the river contained *fast flowing water*, *whirlpools*, and *strong currents*. Two types of strong currents were emphasised and participants reported children struggling to get out of these types of water. Participants said poor children drowned more than rich, as they

were more likely to play indoors in larger houses unaffected by flood. Participant perception revealed Khmer children from outside the locality were more likely to drown: *In my village most of the families are Khmer, Vietnamese and Khmer children swim. But the children from other places, because they cannot swim, they drown and die.*

Some participants talked of industrial areas in regards to drowning risk. Children played around the areas *where they pump sand from the river*. Some children were reported to die from drowning after getting stuck in the mud around areas where companies used machinery to pump sand, fill lakes, or make large holes: *Some places they take the ground out and do not refill. They don't know which place is deep or shallow. One boy was playing near where they pump the sand to fill and little boys play around there. The machine sucked one boy up into the pipe. An hour later they found him already dead.*

Loss

Two participants gave accounts of close family members who had died by drowning. *My son* and grandson went to fish in the lake. My son fell from the boat into the water. He was feeling dizzy. We guess he fainted and fell into the water. My grandson only seven years old tried to jump onto the plants and shout for help. But when he looked back the boat collapsed. He tried to jump to the boat and he died also. It's been almost three years now. As well as speaking about grief, participants indicated anxiety with loss of income and the effect this had on the family.

I think it's a problem because we lose our family members. So we feel regret. Sometimes we feel very sorry that we lose the one who is the head of the family who supports us. My

husband is the one who finds income. So I have lost my post...I have to generate income for my three children. So life is very hard.

Child Supervision

Child supervision was a particular area of concern for all groups. The majority of participants believed that children were most likely to drown between 12 noon to 2pm when parents might be busy preparing lunch or taking a nap following eating. Caregiver participants indicated the difficulty in prioritising supervision over household chores and finding income, often leaving the house for the day. As one participant explained, *it's difficult; we don't have enough time to care for them in order to make a living. Because of the flooding I don't earn much money. If we go to the market to make money to support our family, how can we care? My children are small so I need to stay, I'm afraid I'll lose him again because of the water.*

Participants considered some mothers as lacking in responsibility: *Sometimes their parents are careless, busy going somewhere, gambling and so on.* Other participants argued in defence of parents leaving the house to work which was seen by some as a necessity in order to support their family. Parents and carers within the group often talked of the difficulty of controlling children who were mischievous or disobedient in nature. So, even when we try to stop them swimming they don't listen and just go and play in the water.

Belief

Participants spoke of '*June Gharp*' where ghosts were believed to lure victims to a specific place of danger, usually water, in order to kill them by drowning. This belief would often follow after an occurrence of fatal drowning in a particular area. *They say every year June Gharp has to take three or four people. And they tell their children not to go there. They get scared about that place. They believe it happens the same time every year. They say that place has a ghost that pulls the legs down to the bottom. The majority of participants (97%) did not believe in '<i>June Gharp*' and that spiritual fear would not stop them rescuing a drowning person, regardless of what others in the area believed about that place. One of the older male respondents marked an area of danger close to the Monivong Bridge on the Bassac River, where he believed '*June Gharp*' occurred, as depicted in Figure 1. Participants thought this belief was generally held by older people in Cambodia in rural communities and emphasised how young people now believe in non-spiritual causes for drowning. *It can be because of their lack of skill they cannot swim. Some believe because of the ghost spirit. The old people they thought only spiritual things, but the young people believe in accidents. And skills can help the situation.*

Drowning prevention

Swimming skills and ability were seen as a significant factor in the prevention of childhood drowning in all of the focus groups. There was only one mention that younger ones were taught to swim. Sometimes floatation devices; *logs, rubber rings* and *life jackets* were used as seen in Figure 3. All focus groups emphasised the need for more life jackets and floatation devices, as this was perceived to keep children safe. In Table 2, male participants told more accounts of successful rescue (25%) than female participants (12.5%). Older males saved

more (15%) than younger males (10%) and older females (12.5%) saved more then younger females (0%). Reach rescue techniques were described by the use of *clothes, sticks* and *boats*. All participants spoke positively on their intention to rescue. A lack of swimming ability was repeatedly perceived as a barrier to a rescue attempt.

Facilitator:Did you help the person in the water drowning?Participant:No, because I cannot swim.

Resuscitation techniques described in eyewitness accounts ranged from *holding a child upside-down by the legs, shaking, warming the body on a bed with hot coals underneath.* Mouth-to mouth resuscitation was mentioned less frequently, described as *'blowing wind* or *air'*. Participants described accounts of unsuccessful resuscitation attempts: *I saw a teenager who drowned in the dam. We took his dead body to the pagoda directly and tried to save him by blowing air and heat the body to open up the veins.* [Using a bed with coal fire underneath believed to give strength and to make the blood flow.] *After they heated the body we still could not save him so we took him to hospital. He was dead but we wanted to try to have peace in our heart.*

FGD participants explained how they made covers for large water jars and containers, sometimes placing heavy items on top. Covers made by local people were placed on top of sewer holes, which were close to many homes. Bridge walkways, as seen in Figure 4, were constructed by community members, to make travel possible during the flood seasons. These were sometimes made with fences and with thorns to prevent children falling into the water. One respondent spoke of warning signs and measurement poles, which were used at times. Older participants said they sometimes confronted other parents in regards to the care of their children vulnerable around dangerous waters. *If we see them swimming, we go quickly to call*

the parents to tell them that they are playing in the water. We ask them to tell their children not to swim in those places.

Drowning prevention ideas

Participants gave a range of ideas for drowning prevention during the FGDs. Participants emphasised the need for workshops to teach water safety education, one for children and one for adults. *We have to conduct a workshop for the parents and we should conduct a workshop on how to prevent drowning. I want an organisation to promote this information to prevent drowning.* Participants suggested that information should be disseminated throughout the community advising on safe and dangerous places. Signs to indicate danger were advocated by three participants. Participants from all groups perceived the requirement for provision of safe and shallow areas to swim and play for local children.

If someone cannot swim well, we need someone to be with them. We make a boundary. This place you can swim, you cannot go beyond the boundary. One thing we can do to prevent the children drowning is to ask an organisation to arrange a safe place for our kids to play. We need to provide a shallow place for them to swim. To teach them to swim and to put a sign up to say it's a safe place. Participants highlighted the need for swimming schools or swimming clubs for children in the community. We should have a swimming school so everyone can learn to swim together. It was felt attendance of water safety workshops and swimming instruction would be higher if held at the weekend: I would love to suggest swimming workshops every Saturday or Sunday, best on Sunday.

Participants advised the need for improved child supervision in the community. They called for greater organisation of childcare, using relatives if necessary as well as informing other parents whose children were swimming or playing in dangerous places. Formal supervision was highlighted within the older male and female groups who discussed the use of specially trained police patrolling the water who could supervise children in the water and tell them to get out of the most dangerous places. As many parents were often busy earning money, some participants understood the effectiveness of national television advertisements and television drama's. It was suggested that this tool be used to promote water safety messages in order to prevent childhood drowning: *If we conduct a workshop, some of them cannot come, so maybe a TV drama would be good.* One participant explained the role of a lifeguard to the rest of the group after learning about this concept from a different country. Some participants thought this was a good idea particularly patrolling the most dangerous parts of the river. *Lifeguards skills are good. It's good to have a group of lifeguards to look after them.*

Participants desired government intervention where it was perceived that walls should be built to prevent children swimming in dangerous places. Some understood a wall built on the Waterfront in Phnom Penh to be effective in inhibiting children from playing in the Mekong River. Participants also suggested the need for assistance for riversides maintenance. *Some of the places along the river have subsided. We have to complain to the government to build the sides back up.* Some participants wanted lakes and deep places to be filled: *Example, for me I want the deep places to have fences or can fill with sands again. Some places they take the ground out and do not refill. They don't know which place is deep or shallow.* Participants said the community needed to make more water jar covers. Participants stated they needed assistance in making bridge walkways with fences for protection with resources and assistance provided by government and NGO's: In my dream, I want a bridge; it's better than *the boat. If we have a bridge with a fence at the side there will be more safety.*

Discussion

This study explored community perception of drowning and prevention in a peri-urban setting in Phnom Penh. Mean Chey residents are not representative of Cambodia overall or even the urban population, which makes up 21% for Cambodia nationally. ²⁶ However the information obtained in this study provides a unique window into this community's inhabitants and may serve to indicate needs of the broader peri-urban community concerning water safety for children and potential interventions to decrease drowning risk in this community. Drowning risk factors were explored as well as participant ideas of how prevention could be improved. From shared experience, the groups revealed a good level of knowledge of the risks associated with different bodies of water in the district. Supervision was acknowledged as a key issue for the Mean Chey community which is true in other studies of childhood drowning in neighbouring LMICs in South East Asia (e.g. Thailand and Viet Nam) as well as those elsewhere in Asia (e.g. Jiangxi, China and Bangladesh).

Khmer participants understood sex as a significant predictor of drowning and participants viewed risky play as a barrier to drowning prevention. Another obstacle to prevention was the disobedience of children and the inability to control children who enjoyed playing in dangerous waters. Whilst gauging the will of a community towards prevention efforts it may also be important to understand the culture and beliefs which influence people living in a particular locality of Cambodia. All four groups showed valuable insight into the beliefs and intentions, which informed their responsiveness towards rescuing a person from drowning. Gaining this insight is important in bringing clarity where stereotypes and myths sometimes exist. ²⁷ Participants classed their religion as Buddhist, Christian or Muslim. The majority of participants appeared not to be passive or fatalistic but active in response to rescuing those who drown. In the consideration of drowning prevention, a strong intention to rescue may be valuable in the uptake of basic life support training and implementation within the

community. Some participants made it their responsibility to be vigilant in responding to drowning events. However, some young female participants felt they did not have the physical ability to rescue drowning victims who were of similar size or larger.

All residents lived in close proximity to large aquatic hazards where anecdotes of drowning were common. However, the majority of participants lived close to the river; this bias may mean the group is unrepresentative of much larger peri-urban areas. The CAIS ²³ shows much higher rates of drowning in rural areas where they do not live near a river. It may therefore highlight the need for feasibility studies specific to each locale to improve effective outcomes of prevention measures.

Conclusion

Participants understood the risks around different bodies of water in the locality and believed this increased with close proximity to water. From experiences shared of drowning death and rescue, a sense of vigilance was highlighted from all groups. Caregivers explained the difficulties of caring for children around so much water, exacerbated by annual flooding. Community participants considered; water safety education, swimming instruction and designated safe areas for child play to be effective in the prevention of childhood drowning. I recommend that a broad set of research efforts be undertaken to determine the epidemiology of drowning in this community. An assessment of the ability of the community, the government and local NGOs to provide assistance to the community, based on effective programmes in similar communities, may be necessary. A drowning prevention programme should be piloted in Mean Chey in a move towards a reduction of preventable drowning deaths.

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