

# AN OBSERVATIONAL STUDY TO INFORM POTENTIAL DROWNING INTERVENTION STRATEGIES AMONG FISHING COMMUNITIES IN THE LAKE ZONE OF TANZANIA (DRIFT)

## FINAL STUDY REPORT

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## EXECUTIVE SUMMARY

### Background

Lake Victoria, Africa's largest lake, is surrounded by an abundance of lakeside communities and supports a huge fishing industry. A recent study in Uganda suggested that drowning is a common threat within these communities. Perceived risk of drowning among fisher-folk on Lake Victoria is high, and possibly of greater concern than Human Immunodeficiency Virus (HIV) infection. Yet anecdotal evidence from Tanzanian communities suggests that risky behaviours associated with drowning are common practice.

### Aims and objectives

This study aimed to generate evidence to support development of drowning prevention strategies in high-risk populations around Lake Victoria in Tanzania. Specific objectives were to:

1. estimate the incidence of drowning deaths among fishermen and lakeside communities;
2. improve understanding of who is most at risk and why;
3. evaluate potential effects of perceived drowning risk on other health-related risky behaviours, focusing on sexual behaviour and HIV;
4. assess the social and economic impact of drowning deaths; and
5. explore perceived feasibility and acceptability towards potential drowning prevention interventions.

### Methods

This was a mixed-methods study. We first obtained estimates of the drowning incidence among the lake-side communities by collecting data on all deaths occurring in each community over the past two years. Second, data on risk factors associated with drowning, risky behaviours in the fishing communities, perceived health risks and threats, and perceptions of potential interventions were collected from fishermen and the wider communities at eight lakeside fishing villages through structured surveys/questionnaires, in-depth interviews (IDIs), focus group discussions (FGDs), in-depth death reviews and observational analyses of behaviour. Preliminary data on social and economic impacts of drowning deaths were collected by interviewing family members and colleagues of victims.

### Results

The estimated incidence of drowning among selected lakeside fishing communities was calculated at 231 per 100,000 person-years. Over 80% of drowning deaths were among fishermen (most aged 18-40 years; all male), and 10% were among children (all aged 10 years and under; 33% male). All deaths occurred in the lake. Most incidents among adults occurred while the victim was out in a boat at night time (92% were fishing); but most children died during the day while swimming or playing in water at/near the lake shore, unsupervised. Reported social and economic impacts of the deaths were varied and substantial, ranging from loss of income to family breakdown.

Commonly reported and observed risk-taking behaviours among fishermen in the communities included: fishing in poorly maintained boats and/or boats powered with oars; fishing at night and in bad weather; not wearing a life jacket; and fishing while intoxicated with drugs or alcohol. Risk-taking behaviours among other community members included taking boat transport in bad weather, not wearing life jackets, and being unable to swim. No physical barriers to prevent children going in or near the water were reported; and children frequently go in or near the lake unsupervised.

Other perceived health threats among fishermen and other community members included sexually transmitted infections (STIs; such as HIV), malaria, and diseases associated with unsanitary conditions and the lake (such as schistosomiasis). Drowning and HIV were considered the health threats most likely to affect respondents; and were the health threats most feared. Nonetheless, reported risk-taking behaviours for drowning and HIV acquisition were common. Many fishermen reported that they fear drowning most as it is immediate, and they have no control over it;

while HIV infection is a 'choice' and an 'ordinary issue'. However, this was not a consistent perspective, with some people saying that drowning is bad luck and 'heroic', whereas dying of HIV is 'shameful'.

Numerous potential drowning intervention strategies were identified. Those perceived as most likely to be effective and feasible among fishermen and community members included improved life jackets, boat maintenance training and swimming lessons. Additional potential interventions, guided by risk factors identified in the study, include drowning awareness campaigns and lights on boats.

## Conclusions

Drowning is a significant threat among lakeside fishing communities in Tanzania, with numerous social and economic impacts. However, risky behaviours are common practice. Intervention strategies are urgently required to reduce the drowning burden among fishermen and other community members. Strategies should be guided by the experiences of fisher-folk and information on risk factors and risky behaviours described in this study.

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## ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-retroviral treatment
BMU	Beach Management Unit
CI	Confidence interval
FGD	Focus group discussion
HIV	Human Immunodeficiency Virus
ID	Identification
IDI	In-depth interview
LSHTM	London School of Hygiene and Tropical Medicine
MITU	Mwanza Intervention Trials Unit
NIMR	National Institute of Medical Research
QGIS	Quantum Geographic Information System
RNLI	Royal National Lifeboat Institution
SMS	Short message service
STI	Sexually transmitted infection
SUMATRA	Surface and Marine Transport Regulatory Authority
SWES	Severe Weather Early Warnings
TZS	Tanzanian Shillings
USD	United States Dollar
WHO	World Health Organisation

## CHAPTER 1: INTRODUCTION

### 1.1 Background

The World Health Organisation (WHO) recently identified drowning as a major but neglected public health threat worldwide, killing 372,000 people per year<sup>1</sup>. Drowning incidence data from the African continent are limited; nonetheless, Africa is believed to have the highest drowning incidence worldwide.

Lake Victoria, Africa's largest lake, is bordered by Tanzania, Uganda and Kenya. There is an abundance of large lakeside communities, with a total estimated population of 1.3 million (60% within Tanzania; unpublished data). These communities are supported by, and heavily reliant on, the local fishing industry. However, Lake Victoria is considered one of the world's most dangerous freshwater lakes<sup>2</sup>.

While in-depth data on drowning incidence in Lake Victoria are lacking, a recent observational study of fishing communities in Uganda concluded that drowning is a common threat to young adults; the drowning fatality rate was 502 per 100,000 person-years (though specific age groups affected were not reported)<sup>3</sup>. Furthermore, drowning was found to account for 27% of fatal injuries in rural lakeside Ugandan settings<sup>4</sup>. Anecdotal evidence from our own work within Tanzanian fishing communities suggests that a similar threat exists (unpublished data).

Lake Victoria shoreline communities have disproportionately high rates of extreme poverty, illiteracy and HIV/Acquired Immune Deficiency Syndrome (AIDS) compared with the rest of East Africa<sup>5</sup>. Thus, socio-economic effects of deaths due to drowning among fisher-folk may be considerable, particularly given young working male adults are likely to be most at risk. It was estimated that each Ugandan fisherman who dies leaves behind, on average, eight dependents<sup>2</sup>. Furthermore, evidence from studies among these Ugandan communities<sup>5</sup>, and anecdotal evidence from studies in Tanzania (unpublished data), suggest that perceived risk of death from drowning among fisher-folk is high and significant, more so than the risk of HIV infection. Therefore, in areas already critically afflicted by the AIDS epidemic, the more immediate threat of drowning may lead to fatalistic attitudes and risky behaviours regarding prevention of HIV transmission.

There have been a number of initiatives and strategies evaluated over the past decade for reducing drowning incidence in Lake Victoria fishing communities in Uganda. These include: search and rescue operations<sup>6</sup>; improving maritime communications<sup>7</sup>; delivering Severe Weather Early Warnings (SWES) to smart phones<sup>8</sup>; and redesigning life jackets<sup>2</sup>. Despite these interventions, the recent Ugandan study by Kobusingye *et al* reported that only 26% of fishermen wore life jackets, and 73% did not know how to call for rescue<sup>3</sup>. Frequent factors associated with drowning were stormy weather and overloading. Interviews among Ugandan fishermen and other lakeside workers regarding feasibility of delivering SWES to smart phones revealed that only four per cent had phones that could support such an intervention<sup>8</sup>.

While interventions to prevent drowning in Tanzania are a high priority (assuming that lakeside communities in Tanzania experience similar rates of drowning as Uganda), it is essential that development of such interventions is informed by an in-depth, formal and purpose-built evaluation of populations, behaviours and risks within local fishing communities, as well as community perceptions regarding drowning and feasibility of potential interventions.

### 1.2 Aims and objectives

The overarching aim of this study was to generate evidence to support the development of drowning prevention strategies among fishing communities around Lake Victoria in Tanzania. The specific objectives of the research were to:

- 1) Estimate the incidence of death due to drowning
  - a. among fishermen who work on the lake, and
  - b. among the wider lakeside community who live and work near the lake;
- 2) Improve understanding of who is most at risk of drowning, and why, through

- a. documenting the personal characteristics of the deceased, and the events and circumstances that led to each drowning death, and
  - b. investigating behaviours associated with increased risk of drowning among fishermen and the wider community, and where relevant, the reasons behind these behaviours;
- 3) Evaluate potential effects of perceived drowning risk on other health-related risk-taking behaviours, with a focus on sexual behaviour and HIV;
  - 4) Assess the social and economic impact of death due to drowning; and
  - 5) Explore perceived feasibility and acceptability towards potential drowning prevention interventions.

## CHAPTER 2: METHODS

### 2.1 Study overview

This was a mixed-methods study conducted between September 2017 and February 2018. It involved both qualitative and quantitative, and prospective and retrospective components. The study was approved by the LSHTM Ethics Committee (ref. MR/53/100/480) and the Tanzanian Medical Research Coordinating Committee (MRCC) National Health Research Ethics Committee (NatHREC; ref. 14184). Additionally, written approval was obtained from local authorities. Such approvals are essential to gain access to the target populations and required data sources. The study protocol is provided in Appendix 1.

### 2.2 Study sites and participants

The study was conducted in eight fishing communities on the Tanzanian shoreline of Lake Victoria. Communities within the same ward (an administrative structure at the community level in Tanzania, similar to a small town or group of villages) were grouped into one study site, giving a total of six sites: four sites included only one community, and two included two communities each.

The following criteria were applied in selection of study sites:

1. Each site must have an estimated population size of 1,000 people or more;
2. The sites must be approximately equally distributed around the Tanzanian shore of Lake Victoria;
3. There must be an approximately equal distribution of island and mainland sites;
4. Each site must have a Beach Management Unit (BMU; a community-based organisation responsible for local-level fisheries management) and available Chair Person; and
5. The sites must be logistically feasible for inclusion in the study.

The fishing communities and sites selected for inclusion in the study are shown in Figure 2.1, and brief information on each site is presented in Table 2.1. The study included fishermen and other community members from each of the sites. Adults, aged  $\geq 18$  years and able and willing to provide informed consent, were eligible for inclusion.

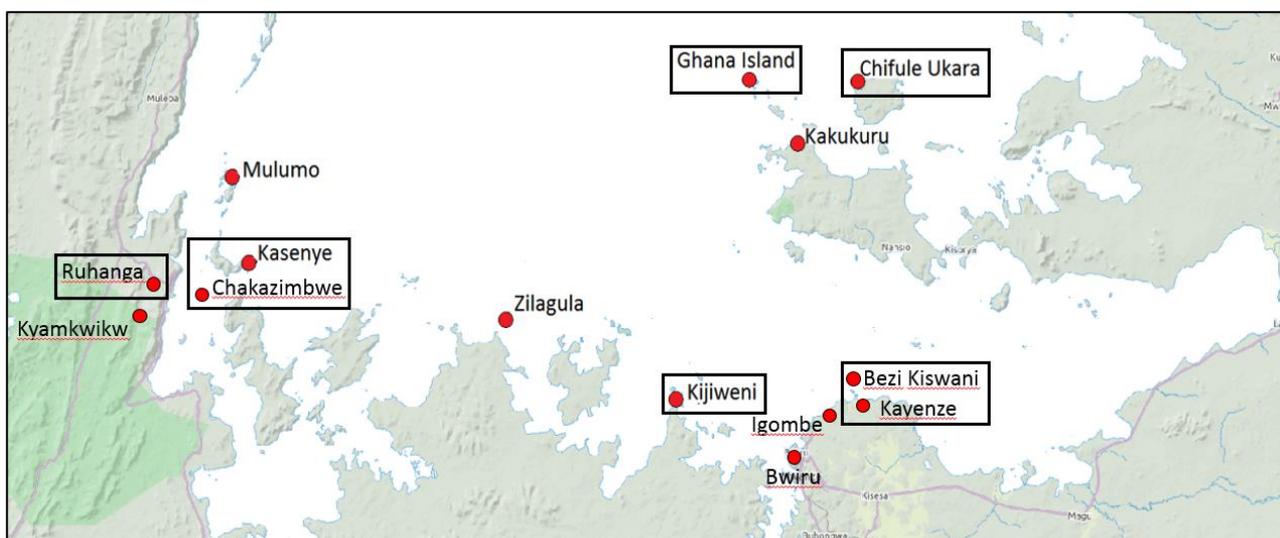


Figure 2.1: Map of study sites.

Sites highlighted using black rectangles were those selected for inclusion. Additionally, a pilot study was conducted at Igombe. Additional communities shown on the map were visited in initial scoping visits but not included in the study as they did not meet inclusion criteria. For reference, Bwiru is within Mwanza.

## 2.3 Recruitment process

Large mobilisation meetings were held at each community to provide information on the study to fishermen and other community members. Residents were invited to the meetings using typical community communication methods (such as by loudspeaker and verbal invitation by community leaders). At the meetings, community members were provided information on the study background, aims and objectives, and methods. Adults were invited to participate in the study; and were asked to approach the study staff to register for the study if they were interested. Eligible participants were later invited to attend consenting sessions. These typically consisted of a group information session with information sheets and consent forms, followed by a one-to-one consenting session with a staff member, in which participants were asked to sign the consent form. For illiterate participants, consenting was conducted in the presence of an independent witness, and the participant's thumbprint was provided in place of a signature. The study leaflet and information and consent forms are provided in Appendices 2 and 3, respectively.

Table 2.1: Brief details of each study site and community.

SITE #	COMMUNITY NAME	ESTIMATED POPULATION	TYPE	WARD	DISTRICT	REGION
1	Chifule Ukara	3,250	Island	Bukungu	Ukerewe	Mwanza
2	Ghana	3,112	Island	Ilangila	Ukerewe	Mwanza
3	Kayenze Bezi Kisiwani	1,750 2,073	Mainland Island	Kayenze	Ilemela	Mwanza
4	Kijiweni	3,175	Mainland	Chifunfu	Sengerema	Mwanza
5	Ruhanga	1,900	Mainland	Gwanseli	Muleba	Kagera
6	Kasenyeye Chakazimbwe	1,850 1,500	Island Island	Ikuza	Muleba	Kagera

## 2.4 Data collection

### Objective 1: Incidence estimation

We collected data on all deaths due to drowning within each community over the two years preceding the date of data collection from BMUs that keep registers of fishermen; local authorities and community leaders, and fishermen and other community members (participating in the surveys described below). Basic information concerning each account of drowning was collected to ensure that the same case was not recorded more than once. Data collection continued until no further drowning deaths were identified.

Population size estimates were obtained from study sites and validated using methods established in previous studies. Further information on population estimates and incidence calculation is provided in Chapter 3.

### Objective 2: Investigation of risk-taking behaviours

Firstly (for objective 2a), in-depth reviews of the events and circumstances that led to each drowning case identified for objective 1 were conducted. Questionnaires were completed by family members and others who knew the habits and behaviours of the deceased, as well as people who were close to the scene of the accident, and colleagues where relevant. The questionnaires were staff-assisted: research staff read aloud questions pre-programmed into data collection tablets and recorded participant responses.

Secondly (for objective 2b), common behaviours associated with increased risk of drowning among fishermen and the wider communities were identified through: staff-assisted questionnaires with 50 fishermen and 50 general community members per site (recruited through mobilisation meetings described above); observation of practices at departure and return of 10 fishing boats per community; IDIs with boat owners, fishermen and other community members at each site; and one FGD with fishermen and other community members per site.

Table 2.2: Methods and populations for each study objective.

OBJECTIVE	METHOD(S) AND POPULATIONS
1. To estimate the incidence of death due to drowning among (a) fishermen who work on the lake, and (b) the wider lakeside community who live and work near the lake.	A. Data collection from BMUs, local authorities, fishermen and other community members at each community.
2a. To improve understanding of who is most at risk of drowning, and why, through documenting the personal characteristics of the deceased, and the events and circumstances that led to each drowning death.	B. Survey at each site with family members and colleagues of drowning victims, and other community members aware of circumstances surrounding the drowning event.
2b. To improve understanding of who is most at risk of drowning, and why, through investigating behaviours associated with increased risk of drowning among fishermen and the wider community, and where relevant, the reasons behind these behaviours	A. Observational analysis of behaviours among fishermen from 10 boats during departure and return at each community. B. Interviews with fishermen, boat owners, and general community members at each site. C. Survey among 50 fishermen and 50 general community members at each site. D. FGD with eight to 10 people per site, including fishermen and other community members.
3. To evaluate potential effects of perceived drowning risk on other health-related risk-taking behaviours, with a focus on sexual behaviour and HIV.	A. Survey among 50 fishermen and 50 general community members at each site. B. Interviews with fishermen at each site. C. FGD with eight to 10 people per community, including fishermen and other community members.
4. To assess the social and economic impact of death due to drowning.	A. Interviews at each community with family members and colleagues of deceased.
5. To explore perceived feasibility and acceptability towards potential drowning prevention interventions.	A. Survey among 50 fishermen and 50 general community members at each site. B. FGD with eight to 10 people per site, including fishermen and other community members.

### Objective 3: Impact on other health-related risk-taking behaviours

Mixed quantitative and qualitative methods were used to meet the third objective. The surveys mentioned above (for objective 2b) also asked respondents (50 fishermen and 50 other community members per site) to rank their ill-health and safety fears and included questions on sexual risk-taking behaviours. This allowed comparison between fishermen and other community members with respect to attitudes to risks and risk-taking behaviours.

Structured interviews were also used to elicit fishermen's perceptions regarding events that are most likely to adversely impact their lives and the lives of their relatives. Fishermen were additionally asked through a more direct line of questioning whether, in their opinions, the risky nature of their work makes them less risk-averse in other areas of life.

### Objective 4: Social and economic impact

Family members and/or colleagues of those who drowned (identified under objective 1) were interviewed to enquire about social economic consequences (e.g. hardship), loss of income and missed opportunities, for example through loss of leadership positions in society.

### Objective 5: Feasibility and acceptability of interventions

The surveys mentioned above (for objectives 2b and 3) also asked respondents (50 fishermen and 50 other community members per site) questions on their perceived feasibility and acceptability of a number of potential drowning interventions pre-specified by the researcher (such as swimming lessons, improved life jackets, barriers around water etc). Additionally, one FGD was conducted at each site with fishermen and other members of the community to discuss feasibility of, and willingness to engage with, alternative prevention strategies.

## 2.5 Pilot study

Prior to the start of data collection for the main study, a pilot study was conducted at a mainland fishing community called Igombe (see Figure 2.1). The purpose of the pilot study was to:

1. Gauge interest in the study among the general community;
2. Assess the proposed procedures for
  - mobilisation of study participants,
  - collecting information on most or all deaths in a community within a defined period of time, and
  - observing routine fishing practices;
3. Test our quantitative data collection tools; and
4. Practice FGDs and IDIs within a relevant setting.

Participants were informed that it was a pilot study and had to consent to take part.

Following the pilot study, minor amendments were made to study procedures and data collection tools prior to commencing the main study. Study results for the pilot were not analysed and have not been included in this report.

## 2.6 Data management and analyses

Quantitative data were collected using participant questionnaires and staff observation charts pre-programmed into electronic handheld tablets. IDIs and FGDs were conducted using prompt sheets and recorded using voice recorders. All data (quantitative and qualitative) were recorded using unique participant identification (ID) codes assigned at enrolment to ensure confidentiality. Consent forms containing participant names were managed by the Study Coordinator and stored immediately in a locked cabinet at MITU upon returning from each site.

Quantitative data from tablets were uploaded to a single spreadsheet for each data collection tool. Incidence estimations (expressed as the death rate per 1,000 person-years) were calculated using the total number of deaths

identified in the preceding two years and population estimates of the targeted communities. Descriptive tables were generated for all other quantitative data. Where applicable, descriptive data were generated for fishermen and community members (adults and/or children) separately, as well as combined.

Interviews and FGDs were conducted in English, transcribed and then translated to English. A thematic approach was taken for analysis of qualitative data, including familiarisation with the data, generating initial codes, identifying themes among codes, and defining the themes.



## CHAPTER 3: ESTIMATED INCIDENCE OF DEATHS DUE TO DROWNING AMONG LAKESIDE FISHING COMMUNITIES

### 3.1 Overview

A recent study from Uganda suggests that the incidence of drowning among fishing communities around Lake Victoria is extremely high<sup>3</sup>. However, data was collected only from one Ugandan fishing community and thus evidence from other areas around the lake shore is lacking.

For objective 1 of this study, we sought to determine the incidence of deaths due to drowning among fishermen and the wider lakeside communities spanning the Tanzanian shore of Lake Victoria. Data were collected from eight fishing communities equally distributed around the shore, including three mainland and five island communities. To reduce recall bias, we aimed to collect data on drowning deaths in each targeted community over the preceding two years.

In Tanzania, there are very few secondary data sources providing comprehensive mortality data. This is particularly marked for deaths occurring in rural communities. Our original plan for collecting data on deaths due to drowning for this study involved targeting health centres, BMUs, police stations, fisheries and local authorities (such as community leaders) and requesting records of all water-related deaths. We then planned to categorise the deaths into those resulting from drowning and those resulting from other causes.

However, during the site scoping visits and pilot study, it became apparent that no single organisation held detailed records of deaths due to drowning and few organisations held any records at all. Furthermore, during community mobilisation meetings and data collection with community members for other study objectives in the pilot study, we received numerous reports of drowning deaths that had not been recorded by any of the above organisations. Thus, large numbers of drowning deaths would have been missed using the original approach.

Due to the challenges described above, we altered our procedures for collection of data on deaths due to drowning. We continued to target BMUs and local authorities for records of drowning deaths. Concurrently, we asked all community members participating in community meetings, questionnaires, FGDs and IDIs to report any drowning cases they knew of in the past two years.

For all reports of a drowning death, a short death review proforma (Appendix 4) was completed, in which basic information on the victim and circumstances of the death were captured. We created a catalogue of all drowning reports within a community and compared the information captured in order to identify cases reported more than once (i.e. by more than one person or organisation). Excluding duplicated reports, a complete list of individual drowning cases was devised. Data collection continued until saturation was reached (i.e. until no new drowning cases were identified).

Following data collection at all communities, a review of each drowning death was conducted to confirm that the most likely cause of death was drowning. In addition, reported dates of death were compared against date of data collection to ensure that all deaths occurred within the preceding two years. The final list of drowning deaths was compiled, and this was used to estimate the incidence of deaths due to drowning.

### 3.2 Obtaining population estimates

At each community, BMUs and community leaders were asked to provide population estimates, first at the site scoping visits, and second at the main data collection visits. We then sought to validate the population estimates provided at the community level using established methods devised from previous studies conducted by MITU in similar communities and populations. In brief, by combining data on the area of a given community calculated from satellite images using Quantum Geographic Information System (QGIS) software with the average population density for small lakeside fishing communities, an estimated quantity of 0.029 persons residing per square metre of a populated area was established (unpublished data). This allows calculation of approximated population using the following simple formula:  $Population = area (m^2) \times 0.029$

In the current study we used satellite images of the eight targeted communities to estimate the area of the most populated sections (identified visually) and applied the above formula. In cases where a given community had multiple populated sections, these were combined (added together) to give a single population estimate for that community. The satellite images the population sizes are derived from are shown in Figures 3.1 to 3.8.



Figure 3.1: Satellite image of Ghana Island, with most populated region selected, and area shown.



Figure 3.2: Satellite image of populated region of Kasenyi Island targeted in study, with area shown.

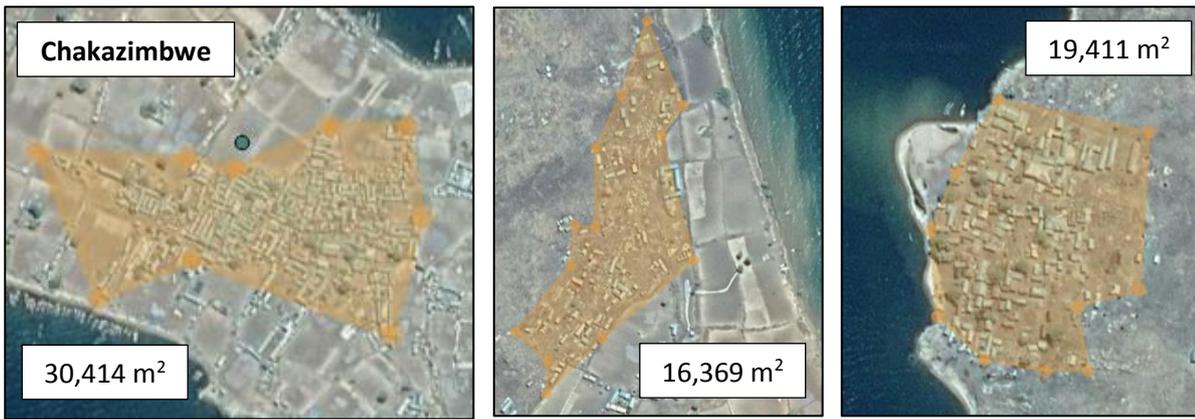


Figure 3.3: Satellite images of populated regions of Chakazimbwe Island, with area calculations shown.



Figure 3.4: Satellite image of Kijiweni, with most populated region selected, and area shown.

For many sites, the population estimates derived from the communities and the satellite images were very similar. For a few communities, the estimates derived from satellite images were higher than the estimates provided at the sites. However, it is clear from the satellite images that the areas selected at some of these communities (particularly Ruhanga and Chifule Ukara) are less densely populated than at other sites. Therefore, the satellite image-derived estimations for these communities could not be considered reliable.

Interestingly, there is a trend for greater concurrence between site and satellite image-derived estimates in island communities compared to mainland communities. Typically, the satellite-derived estimates are higher than the site estimates in the mainland communities. This likely reflects the fact that, on the islands, the whole population makes up the fishing community, overseen by one BMU and community leader. On the mainland, however, the fishing community sometimes makes up one distinct area of a larger village or town, and the BMU and community leader oversee just that

specific fishing community area (for example in Kayenze). In the current study, just the specific fishing communities were targeted for collection of both drowning death data and population data.



Figure 3.5: Satellite image of Kayenze, with most populated region selected, and area shown.



Figure 3.6: Satellite image of Bezi Kisiwani Island, with most populated region selected, and area shown.



Figure 3.7: Satellite image of Ruhanga, with most populated region selected, and area shown.



Figure 3.8: Satellite image of Chifule Ukara, with most populated region selected, and area shown.

Collating all the evidence on population sizes and factors affecting reliability, we compiled a set of estimations for each community based on the data that we considered to be most reliable and robust (Table 3.1). This final list was used together with the drowning death data to calculate the estimated incidence of deaths due to drowning. To account for potential margins of error in the population estimates, arising from the limitations described above, we performed sensitivity analyses under a couple of extreme scenarios, first assuming the largest plausible population sizes for all communities, and second assuming the smallest plausible population sizes for all communities. The range of plausible values for each site was defined by the range of population counts offered by the local authorities at each visit and the area-based population estimates from satellite images.

### 3.3 Estimated incidence of death due to drowning

In total, across the eight communities, 86 confirmed drowning deaths occurred within the two-year recall period. The number of deaths per site are shown in Table 3.1 along with incidence estimates for each site and overall. Of the 86 deceased, nine (10%) were under 10 years of age and 70 (81%) were fishermen. The remaining seven (eight per cent) were adults not involved in the fishing industry.

Table 3.1: Number, and estimated incidence of, drowning deaths from eight Tanzanian lakeside communities.

	TOTAL DROWNING DEATHS <sup>#</sup>	DEATHS AMONG FISHERMEN <sup>§</sup>	DEATHS AMONG CHILDREN	POPULATION SIZE	PERSON-TIME AT RISK	INCIDENCE PER 1,000 PERSON-YEARS (95% CI)
<b>Island communities</b>						
Ghana	13	10 (77%)	1 (8%)	3,250	6,500	2.00 (1.07; 3.42)
Kasenyi	11	9 (82%)	1 (9%)	3,112	6,224	1.77 (0.88; 3.16)
Chakazimbwe	6	5 (83%)	1 (17%)	1,750	3,500	1.71 (0.63; 3.73)
Bezi Kisiwani	2	2 (100%)	0 (0%)	1,900	3,800	0.53 (0.06; 1.90)
Chikule Ukara	11	8 (73%)	2 (18%)	1,500	3,000	3.67 (1.83; 6.55)
<b>Mainland communities</b>						
Kijiweni	28	26 (93%)	1 (4%)	2,073	4,146	6.75 (4.49; 9.75)
Kayenze	5	2 (40%)	1 (20%)	3,175	6,350	0.79 (0.26; 1.84)
Ruhanga	10	8 (80%)	2 (20%)	1,850	3,700	2.70 (1.30; 4.96)
<b>All communities</b>						
Overall <sup>§</sup>	86	70 (81%)	9 (10%)	18,610	37,220	2.31 (1.85; 2.85)

<sup>#</sup> Total number of drowning deaths among community population in the past two years. <sup>§</sup> Number of drowning deaths among fishermen in the communities. <sup>§</sup> Pooled overall incidence estimate assuming a single fixed underlying incidence rate, i.e. no inter-site heterogeneity. CI: Confidence Interval.

The estimated overall incidence across the eight communities was 2.31 (95% Confidence Interval (CI): 1.85; 2.85) drowning deaths per 1,000 person-years.

To compare island and mainland mortality rates, we derived random-effects meta-analytic incidence estimates to account for heterogeneity between study sites. The overall (pooled) incidence across the five island communities was 1.77 (95% CI: 1.01; 2.73) deaths per 1,000 person-years; the pooled incidence across the three mainland communities was 2.91 (0.43; 7.40) deaths per 1,000 person-years. There was no statistical evidence of a difference in incidence rates between island and mainland sites ( $p = 0.498$ ).

### 3.4 Discussion

In this study, we identified a total of 86 drowning deaths occurring in the preceding two years in the eight targeted Tanzanian fishing communities around the shores of Lake Victoria. Based on an estimated population size within these communities of 18,610, this gives an annual mortality rate of 231 per 100,000 population. As expected, the majority of deaths were among fishermen. On the assumption that fishermen make up approximately 50% of the adult male population in rural fishing communities, equivalent to approximately one eighth of the population (assuming a 1:1 male-

to-female ratio, and half the population aged 17 or younger), this gives an annual mortality rate of 1,505 per 100,000 fishermen. The rate of drowning among other community members was considerably lower than in fishermen, but still significant at 49 per 100,000.

The drowning mortality rate among the fishing communities in this study was significantly higher than the estimated mortality rate of approximately 8 per 100,000 population reported for the African continent by the WHO in 2014<sup>1</sup>. This is to be expected and represents the far higher risk of drowning among populations that live by and work in water. While we consider the results of the current study to be generalisable to other fishing communities surrounding Lake Victoria in Tanzania (and possibly the neighbouring countries), they cannot be extrapolated to the rest of the country.

However, the drowning rate reported in this study was considerably *lower* than that reported in the recent study by Kobusingye *et al* (502 per 100,000 population)<sup>3</sup>. Researchers in the Ugandan study approached people directly at boat landing sites while they were disembarking boats and collected data on numbers of family members of participants who had died in a drowning incident. The mortality rate was calculated using the number of deaths identified ( $n = 141$ ) and the calculated household population of the 544 respondents ( $n = 2804$ ). This approach may have resulted in an inflated mortality rate for a number of reasons. Most notably, details of the drowning victims were not collected, and thus it cannot be ruled out that some deaths were counted more than once, resulting in an inflated numerator. Secondly, selection bias may have arisen from approaching potential participants as they disembarked from boats as it is possible that their respective families use the water more than other members of the same lakeside communities, and people may have had more interest in taking part in the study if they had a family member who drowned. In addition, it appears that the mortality rate calculated was based on the assumption that all drowning deaths occurred within the past 10 years, but it was not clear that this time period was specified in the interviews. If any deaths preceded the 10 years prior to data collection, the denominator (i.e. the person time at risk) would have been an under-estimate. Similarly, it is not clear that the deceased family members came from the reported household population of 2804, and thus (again) the denominator may have been an under-estimate.

To mitigate some of these limitations, we took a different approach to collecting mortality data in the current study. First, we sought to identify all drowning deaths occurring within a community over the two years preceding data collection, and to use the total community population size (multiplied by two to obtain the number of person-years at risk) as the denominator. This is likely to have reduced selection bias as data collection was not confined to a particular demographic within a fishing community but reflected the whole community. Second, we collected detailed information about the drowning victim and the circumstances of the death, allowing us to remove duplicated accounts of the same incident. Third, we only collected data on drowning victims who were known to be staying in the targeted community at the time of death and were thus more likely reflected in the population size used in the denominator.

Despite these measures to ensure accuracy of our mortality data, there were still a number of limitations that should be considered when interpreting the data. While we sought to identify all drowning cases occurring in each community in the past two years, it is possible that some may have been missed due to a lack of reliable and comprehensive death records in the communities. This may have led to an under-estimation of drowning deaths. In addition, obtaining reliable population estimates was difficult, particularly as the targeted communities are known to be transient in nature, with fishermen and other community members frequently moving between communities.

To reduce the impact of these latter factors, we performed sensitivity analyses allowing for over- and underestimated population sizes. These showed that, when using the largest of the reported population counts at all eight communities, the annual mortality rate due to drowning was reduced to 200 per 100,000 population. When using the smallest of the reported population counts at all communities, the annual mortality rate was increased to 274 per 100,000.

Despite the limitations, these data clearly demonstrate that, within these communities, drowning is a significant health threat contributing equal or higher death rates than many other commonly known health threats in the region. For example, the Tanzanian annual mortality rates from HIV/AIDS, malaria and Tuberculosis, are approximately 154, 44 and 50 deaths per 100,000 population, respectively<sup>9,10</sup>. Annual mortality from cardiovascular disease in Tanzania is high, at approximately 220 per 100,000 population, and more comparable to the drowning mortality rate in the lakeside fishing communities<sup>11</sup>. In terms of injury-related deaths, the mortality rate from drowning among these communities is almost 30-fold higher than the national mortality rate from road traffic accidents (8 per 100,000 population in 2010)<sup>12</sup>.

While numerous initiatives and targets are in place to reduce mortality from most of the health threats listed above, currently, there is little emphasis within Tanzania on drowning prevention. However, our data provide substantive evidence that, within these fishing communities (which contribute a notable proportion of Tanzania's population), drowning is a significant yet neglected cause of mortality, warranting attention at the policy level.



## CHAPTER 4: RISK FACTORS ASSOCIATED WITH HISTORICAL DEATHS DUE TO DROWNING

### 4.1 Overview

There is some evidence from Uganda on common risk factors for drowning among fishermen and other community members living on Lake Victoria. Of 141 fatal drowning incidents from one lakeside community, over three quarters occurred during transportation or while the victim was fishing<sup>3</sup>. Risk factors associating with capsizing of boats included stormy weather, overloading, and the old age of the boats.

For objective 2a of the current study, we aimed to evaluate characteristics of drowning victims on the Tanzanian shores of Lake Victoria, and the circumstances surrounding their deaths, in order to identify common risk factors for drowning. To do this, we approached family members, colleagues or community leaders of each drowning victim identified in Chapter 3 (i.e. someone in the community who knew details of the victim and the drowning incident) and asked them to complete a detailed questionnaire (Appendix 4).

We asked about the demographics of the deceased, as well as common practices involving water while they were alive. In cases where the victim was a fisherman, we asked about their routine fishing practices, the boat(s) they commonly fished from (where applicable), their methods of communication when out fishing, whether they went fishing in bad weather, whether they drank alcohol or took drugs while fishing and other factors. In cases where the victim was another community member, we asked how often he/she would go in or near the water and for what reason(s). Where the victim was a child, we also asked about his/her caregiver, and whether the child was usually supervised when he/she went in or near the water.

In the questionnaire we went on to ask questions about the circumstances of each drowning incident. We asked where the victim was and what they were doing prior to the incident, why they entered the water, and about risk factors potentially associated with their death. We also asked about the events that followed, including whether help was called, and whether the victim was taken to hospital. A description of each incident was documented.

### 4.2 Interviewee details

Brief demographics of the persons completing questionnaires about the drowning victims are shown in Table 4.1. Most were friends, community leaders or other community peers of the victim; only 15% were family members. The majority (87%) of respondents were male.

Table 4.1: Interviewee details.

VARIABLE	INTERVIEWEE (N = 86)
<b>Gender</b>	
	Male 75 (87%)
	Female 11 (13%)
<b>Age (years)</b>	
	Mean 38
	Median 38
	Range 21 – 65
<b>Relation to deceased</b>	
	Parent/Spouse 2 (2%)
	Other family member 13 (15%)
	Colleague 8 (9%)
	Community leader 16 (19%)
	Friend/Other community member 47 (55%)

### 4.3 Demographics of the deceased

Table 4.2 provides the demographic details of the 86 drowning victims identified within the eight communities over the preceding two years. Over 80% of victims were fishermen. Of the fishermen, all were male, and the majority were aged between 18 and 40 years when they died. Only half were permanent residents of the community; the others were temporary residents, visiting the community mostly for work. Over half of fishermen who drowned were married, and most had at least one dependent.

Of the other community members who drowned, nine were children and seven were adults. The children who drowned were mostly female (67%), and all were aged 10 years or younger at the time of death. Almost 80% of children were born in and lived in the community where they died. However, two were visiting. As for the fishermen, most of the adult community members who drowned were male and aged between 18 and 40 years. However, unlike the fishermen, the majority were residing in the community rather than visiting. Over 70% of adult community members were married, and just over half had at least one dependent.

Table 4.2: Demographic characteristics of drowning cases.

VARIABLE	FISHERMEN (N = 70)	ADULT COMMUNITY MEMBERS (N = 7)	CHILD COMMUNITY MEMBERS (N = 9)	TOTAL (N = 86)
<b>Gender</b>				
Male	70 (100%)	5 (71%)	3 (33%)	78 (91%)
Female	0 (0%)	2 (29%)	6 (67%)	8 (9%)
<b>Age at death (years)</b>				
<5	0 (0%)	0 (0%)	4 (44%)	4 (5%)
5-10	0 (0%)	0 (0%)	5 (56%)	5 (6%)
11-17	1 (1%)	0 (0%)	0 (0%)	1 (1%)
18-30	28 (40%)	2 (29%)	0 (0%)	30 (35%)
31-40	27 (39%)	3 (43%)	0 (0%)	30 (35%)
≥41	12 (17%)	2 (29%)	0 (0%)	14 (16%)
Unknown	2 (3%)	0 (%)	0 (0%)	2 (2%)
<b>Race</b>				
Black African	70 (100%)	7 (100%)	9 (100%)	90 (100%)
<b>Community</b>				
Kijiwani	26 (37%)	1 (14%)	1 (11%)	28 (33%)
Ghana	10 (14%)	2 (29%)	1 (11%)	13 (15%)
Kasenyi	9 (13%)	1 (14%)	1 (11%)	11 (13%)
Chifule Ukara	8 (11%)	1 (14%)	2 (22%)	11 (13%)
Ruhanga	8 (11%)	0 (0%)	2 (22%)	10 (12%)
Kayenze	2 (3%)	2 (29%)	1 (11%)	5 (6%)
Chakazimbwe	5 (7%)	0 (0%)	1 (11%)	6 (7%)
Bezi Kisiwani	2 (3%)	0 (0%)	0 (0%)	2 (2%)
<b>Tribe</b>				
Mzinza	1 (1%)	0 (%)	1 (11%)	2 (2%)
Mhaya	14 (20%)	1 (14%)	2 (22%)	17 (20%)
Mjaluo	4 (6%)	0 (0%)	1 (11%)	5 (6%)
Mjita	4 (6%)	1 (14%)	0 (0%)	5 (6%)
Msukuma	11 (16%)	2 (29%)	2 (22%)	15 (17%)
Mkara/Mkerewe	12 (17%)	1 (14%)	2 (22%)	15 (17%)
Mkuria/Mshashi	11 (16%)	1 (14%)	0 (0%)	12 (14%)
Other/Don't know	13 (19%)	1 (14%)	1 (11%)	15 (17%)

Table 4.2 continued.

<b>Religion</b>					
Catholic	23 (33%)	1 (14%)	3 (33%)	27 (31%)	
Muslim	13 (19%)	2 (29%)	0 (0%)	15 (17%)	
Anglican	1 (1%)	0 (0%)	2 (22%)	3 (3%)	
Other Christian	21 (30%)	4 (57%)	3 (33%)	28 (33%)	
No religion	3 (4%)	0 (0%)	0 (0%)	3 (3%)	
Unknown	9 (13%)	0 (0%)	1 (11%)	10 (12%)	
<b>Link to community</b>					
Born and live in community	7 (10%)	1 (14%)	7 (77%)	15 (17%)	
Born elsewhere, live in community	28 (40%)	4 (57%)	0 (0%)	32 (37%)	
Visiting community for work	29 (41%)	2 (29%)	0 (0%)	31 (36%)	
Visiting community for other reason(s)	3 (4%)	0 (0%)	2 (22%)	5 (6%)	
Unknown	3 (4%)	0 (0%)	0 (0%)	3 (3%)	
<b>Time spent in community (for n = 71 victims not born in community)</b>					
<1 year	14 (22%)	0 (0%)	1 (1%)	15 (21%)	
1 to <5 years	23 (37%)	3 (4%)	0 (0%)	26 (37%)	
5 to <10 years	12 (19%)	1 (1%)	0 (0%)	13 (18%)	
10+ years	13 (20%)	2 (3%)	0 (0%)	15 (21%)	
Unknown	1 (2%)	0 (0%)	1 (1%)	2 (3%)	
<b>FOR THE N = 77 ADULT VICTIMS (fishermen: n = 70; adult community members: 7):</b>					
<b>Primary occupation</b>					
Fishing	70 (100%)	0 (0%)	Not applicable	70 (91%)	
Other fishing industry	0 (0%)	2 (29%)	Not applicable	2 (3%)	
Teacher/Education	0 (0%)	1 (14%)	Not applicable	1 (1%)	
Vendor	0 (0%)	3 (43%)	Not applicable	3 (4%)	
Other, employed	0 (0%)	1 (14%)	Not applicable	1 (1%)	
<b>Marital status (for n = 77 adult victims)</b>					
Married	39 (56%)	5 (71%)	Not applicable	44 (57%)	
Divorced	3 (4%)	0 (0%)	Not applicable	3 (4%)	
Single	21 (30%)	2 (29%)	Not applicable	23 (30%)	
Unknown	7 (10%)	0 (0%)	Not applicable	7 (9%)	
<b>Number of dependents (for n = 77 adult victims)</b>					
0	30 (43%)	3 (43%)	Not applicable	33 (43%)	
1-3	28 (40%)	1 (14%)	Not applicable	29 (38%)	
4-6	11 (16%)	2 (29%)	Not applicable	13 (17%)	
7+	1 (1%)	1 (14%)	Not applicable	2 (3%)	

#### 4.4 Other characteristics of the deceased

##### Other characteristics among fishermen

Table 4.3 shows routine fishing practices of the 70 deceased fishermen while they were still alive. Most had worked in the fishing industry for between one and 10 years. The majority fished from boats and at night (either at night only or both during the day and at night) and most went fishing at least 10 times per month.

Of the 67 deceased fishermen who routinely fished from a boat (Table 4.4), all used boats made from wood, and over half of the boats were powered only by oars. While at least a third of the deceased fishermen fished from boats that were poorly maintained, very few boats were reportedly routinely overloaded with people or other items.

Over half of the deceased fishermen were reportedly not able to swim (Table 4.5) and less than five per cent owned a life jacket or wore one while fishing.

Table 4.3: Fishing practices of deceased fishermen.

VARIABLE	FISHERMEN (N = 70)
<b>Time worked in fishing industry</b>	
<1 year	7 (10%)
1 to 4 years	21 (30%)
5 to 10 years	26 (37%)
>10 years	14 (20%)
Don't know	2 (3%)
<b>Type of fish</b>	
Dagaa	8 (11%)
Other fish	61 (87%)
Don't know	1 (1%)
<b>Fishing method</b>	
Nets	20 (29%)
Line and hook	50 (71%)
<b>Time of fishing</b>	
Daytime	12 (17%)
Night	19 (27%)
Both	39 (56%)
<b>Fishing location</b>	
Boat	67 (96%)
Shore	3 (4%)
<b>Estimated number of fishing trips per month</b>	
1 to 10	29 (41%)
11 to 20	36 (51%)
21 to 30	5 (7%)

Table 4.4: Boating practices of deceased fishermen.

VARIABLE	FISHERMEN USING BOATS (N = 67)
<b>Type of boat</b>	
Wooden	67 (100%)
<b>Method(s) of power</b>	
Engine	27 (40%)
Sails	3 (4%)
Oars	36 (54%)
Sails and oars	1 (1%)
<b>Boat ever overcrowded (with people)</b>	
Yes	1 (1%)
No	62 (93%)
Don't know	4 (6%)
<b>Boat ever overloaded (other items)</b>	
Yes	3 (4%)
No	59 (88%)
Don't know	5 (7%)
<b>Boat poorly maintained</b>	
Yes, always	3 (4%)
Yes, sometimes	22 (33%)
No	35 (52%)
Don't know	7 (10%)

Only half of deceased fishermen ever took a mobile phone with them when they went fishing (Table 4.6). Of those taking a phone, none had smart phones and only one was reported to have had an emergency contact number saved in their phone (however, the specific contact was not reported). Almost 20% of fishermen taking a mobile phone fishing had previously used it to call for help when they felt unsafe, and in most cases the person called was another fisherman.

Table 4.5: Ability to swim, and use of buoyancy devices when fishing.

VARIABLE	FISHERMEN (N = 70)
<b>Ability to swim</b>	
Yes	22 (31%)
No	43 (61%)
Don't know	5 (7%)
<b>Owned a life jacket</b>	
Yes	3 (4%)
No	65 (93%)
Don't know	2 (3%)
<b>Used lifejacket when fishing</b>	
Yes, all the time	1 (1%)
Yes, sometimes	3 (4%)
No	66 (94%)
<b>Other type(s) of buoyancy device available</b>	
Yes*	6 (9%)
No	58 (83%)
Don't know	6 (9%)

\*In all six cases, the other type of buoyancy device reported was a large plastic container (such as an empty plastic fuel container).

Table 4.6: Mobile phone communication while fishing.

VARIABLE	FISHERMEN (N = 70)
<b>Ever took a mobile phone when fishing</b>	
Yes	36 (51%)
No/Don't know	34 (49%)
<b>OF N = 36 FISHERMEN WHO TOOK A MOBILE PHONE FISHING:</b>	
<b>Type of phone</b>	
Smart phone	0 (0%)
Non-smart phone	36 (100%)
<b>Phone supported internet</b>	
Yes	1 (3%)
No	32 (89%)
Don't know	3 (8%)
<b>Emergency contact saved in phone</b>	
Yes	1 (3%)
No	15 (42%)
Don't know	20 (56%)
<b>Ever called someone if felt unsafe</b>	
Yes	7 (19%)
No	15 (42%)
Don't know	14 (39%)
<b>Person/organisation(s) called (of n = 7 who called for help)</b>	
Family member	3 (43%)
Another fisherman	4 (57%)
Boat owner	2 (29%)

Almost half of deceased fishermen routinely chose to still go fishing in bad weather and over half would not return to shore if the weather turned bad while they were already out fishing (Table 4.7). Very few fishermen were reported to have sought information on the weather forecast from the radio or television (or another reputable source) before or while fishing; 80-90% monitored the weather only by watching the sky/conditions.

Table 4.8 shows alcohol and drug use when fishing among deceased fishermen while they were still alive. For the majority of fishermen, no alcohol or drug use while fishing was reported; 20% were reported to have drunk alcohol while fishing, and 10% were reported to have used marijuana. However, respondents did not know whether the deceased drank alcohol or used drugs in 16% and 19% of cases, respectively.

Table 4.7: Weather conditions and fishing activities.

VARIABLE	FISHERMEN (N = 70)
<b>Went fishing in bad weather</b>	
Yes	31 (44%)
No	31 (44%)
Don't know	8 (11%)
<b>Returned if weather turned bad</b>	
Yes, always	1 (1%)
Yes, sometimes	30 (43%)
No	37 (53%)
Don't know	2 (3%)
<b>Source of weather forecast before fishing</b>	
Radio/television	3 (4%)
Sky/weather condition observations	55 (79%)
Did not look at weather forecast	7 (20%)
Don't know	5 (7%)
<b>Source of weather forecast while fishing</b>	
Sky/weather condition observations	63 (90%)
Did not look at weather forecast	3 (4%)
Don't know	4 (6%)

Table 4.8: Drug and alcohol use while fishing.

VARIABLE	FISHERMEN (N = 70)
<b>Ever drank alcohol while fishing</b>	
Yes	14 (20%)
No	45 (64%)
Don't know	11 (16%)
<b>Ever used drugs while fishing</b>	
Yes*	7 (10%)
No	50 (71%)
Don't know	13 (19%)

\*In all cases the drug taken was marijuana.

### Other characteristics among other community members $\geq 18$ years

Table 4.9 shows routine water-based practices of deceased adult community members before they died. Most went in or near the water five to seven days per week, and most common reasons included to buy or sell fish, to travel, to collect water, to wash themselves or another person, and to wash clothes and/or other items. The vast majority of deceased adult community members went in or near the water only in the daytime (rather than at night).

Over 70% of deceased adult community members could not swim, yet none owned or ever wore a life jacket. Just under half were reported to still go in or near the water in bad weather, and the same proportion had previously drunk alcohol before going in or near the water.

Table 4.9: Water-based practices of deceased adult community members.

VARIABLE	ADULT COMMUNITY MEMBERS (N = 7)
<b>Number of days went in/near water per week</b>	
<1 day per week	1 (14%)
2 to 4 days per week	2 (29%)
5 to 7 days per week	4 (57%)
<b>Reason(s) for going in/near water</b>	
To wash themselves/someone else	3 (42%)
To wash clothes/other items	3 (42%)
To travel	4 (57%)
To collect water	4 (57%)
To buy or sell fish	6 (85%)
For other work	1 (14%)
To swim or for other recreation	2 (29%)
<b>Time(s) of day commonly went in/near water</b>	
Morning	4 (57%)
Afternoon	5 (71%)
Evening	6 (86%)
Night	2 (29%)
<b>Ability to swim</b>	
Yes	1 (14%)
No	5 (71%)
Don't know	1 (14%)
<b>Owned a life jacket</b>	
Yes	0 (0%)
No	6 (86%)
Don't know	1 (14%)
<b>Ever used a lifejacket</b>	
Yes	0 (0%)
No	6 (86%)
Don't know	1 (14%)
<b>Ever went in/near water in bad weather</b>	
Yes	3 (43%)
No	2 (29%)
Don't know	2 (29%)
<b>Ever went in/near water under influence of alcohol</b>	
Yes	3 (43%)
No	4 (57%)
<b>Ever went in/near water under influence of drugs</b>	
Yes	0 (0%)
No	5 (71%)
Don't know	2 (29%)
<b>Ever called for help when felt unsafe in/near water</b>	
Yes*	1 (14%)
No	0 (0%)
Don't know	6 (86%)

\*One community member shouted out for help when they felt unsafe in/near the water.

## Other characteristics among other community members <18 years

Tables 4.10 and 4.11 show characteristics of the nine children who died and their primary caregivers. For most children, their primary caregiver was their mother or father. For two, their primary caregiver was their grandparent. All caregivers were between 25 and 55 years old. Just over half of the deceased children went to school or nursery before they died.

Just under half of the deceased children did not routinely go into or near the water according to the respondent. Of the five children who did, most went at least four days per week. Common reasons for children going in or near the water included to swim or for other recreation, to collect water, and to wash themselves or someone else. Most went into or near the water in the afternoon. Three of the five children went without permission from their caregiver, and the same number would go either without supervision or under the supervision of another child. Only one child was reported to be able to swim, and none of the deceased children were reported to ever wear life jackets when in or near water.

Table 4.10. Characteristics of caregivers, and nursery/school attendance, of children who drowned.

VARIABLE	CHILD COMMUNITY MEMBERS (N = 9)
<b>Primary caregiver</b>	
Parent	7 (78)
Grandparent	2 (22%)
<b>Gender of caregiver</b>	
Male	2 (22%)
Female	7 (78%)
<b>Age of primary caregiver (years)</b>	
Mean	40
Median	42
Range	25 – 55
<b>Attended nursery/school</b>	
Yes	5 (56%)
No	4 (44%)

Table 4.11: Water-based practices of deceased child community members.

VARIABLE	CHILD COMMUNITY MEMBERS (N = 9)
<b>Ability to swim</b>	
Yes*	1 (11%)
No	8 (89%)
<b>Frequency of going in/near water</b>	
Never	4 (44%)
Less than once per week	1 (11%)
1 to 3 days per week	1 (11%)
4 or more days per week	3 (33%)
<b>OF THE N = 5 CHILDREN WHO USED TO GO IN/NEAR THE WATER:</b>	
<b>Reason(s) for going in/near water</b>	
To wash themselves/someone else	2 (40%)
To wash clothes/ other items	1 (20%)
To travel	1 (20%)
To collect water	2 (40%)
To swim or for other recreation	3 (60%)
<b>Time(s) of day commonly went in/near water</b>	
Morning	1 (20%)
Afternoon	3 (60%)
Evening	2 (40%)
Night	0 (0%)

Table 4.11 continued.

<b>Supervisor of child when in/near water</b>	
Family member or friend, adult	1 (20%)
Family member or friend, child	2 (40%)
No one	1 (20%)
Don't know	1 (20%)
<b>Permission ever sought from caregiver to go in/near water</b>	
Yes	0 (0%)
No	3 (60%)
Don't know	2 (40%)
<b>Ever used a lifejacket</b>	
Yes	0 (0%)
No	5 (100%)

\*One child was reported to have taught herself to swim.

#### 4.5 Circumstances leading to drowning deaths

Table 4.12 summarises the circumstances of the 86 drowning deaths occurring in the two years preceding data collection. All 86 victims died in the lake.

Of the 70 victims who were fishermen, over 95% were in a boat prior to the drowning incident. Sixty-five were fishing, one was travelling, and one was on patrol. In the majority of these cases, the fisherman drowned because the boat sank or capsized in bad weather. In most other cases where the boat sank or capsized, it resulted from holes in the boat or collision with rocks or another boat. Six fishermen drowned because they fell out of the boat accidentally (the reasons for which are listed in Table 4.12), and three were pushed or otherwise forced into the water in attacks. Of two fishermen on the shore prior to the incident, one was drunk and went into the water for unknown reasons, and the other went into the water trying to escape arrest. Community members believed that the latter was trying to swim away.

Of the seven adult community members who drowned, four were on a boat prior to the incident. Three (who were travelling) drowned because the boat sank or capsized in bad weather, and one had gone into the water to clean the boat. One adult community member was drunk and purposefully entered the water but for unknown reasons. For one fisherman and two other adult community members, it is not known where they were or what they were doing prior to the incident. It is also not known why they drowned. Their bodies were recovered at the lakeshore, and drowning was deemed to be the cause of death.

Of the nine children who drowned, only one was in a boat prior to the incident. This child was the daughter of the fisherman who drowned while travelling (described above). She drowned in the same incident when the boat that they were travelling on sank due to bad weather. In all other cases, the children were on the lakeshore prior to the incident. Six were swimming or playing in the lake when they drowned. In most cases they drowned because they could not swim. Two girls (cousins) drowned in the same incident. One could not swim and the other tried to save her; both died. Two children were thought to be on land prior to the incident, but there was no information on what they were doing or why they drowned. Their bodies were found on the lakeshore, and the case of death was deemed to be drowning.

Tables 4.13 to 4.16 provides some further details on the circumstances of the drowning deaths. Over 40% of the deaths occurred at night time, and almost half were during bad weather with rough water conditions. However, these data are skewed by the adult deaths; no children died at night or during bad conditions. Only two of the 86 drowning victims were wearing lifejackets at the time of death (both adults). Thirteen per cent of fishermen, and almost half of adult community members, were under the influence of alcohol at the time of death. Six per cent of fishermen were under the influence of drugs.

Of the 72 victims who were on boats prior to the incident, most were on small fishing boats. All boats involved were made of wood, and the majority were powered only by oars. Few boats were thought to be overloaded with people or other items at the time of the incident, and only 15% were considered to be poorly maintained.

Table 4.12: Summarised circumstances of drowning deaths among fishermen, adult community members and child community members.

<b>N = 86 DROWNING DEATHS</b>
<b>FISHERMEN (N = 70)</b>
67 fishermen were in a boat on the lake prior to the drowning incident (65 fishing, 1 travelling, and 1 on patrol).
<ul style="list-style-type: none"> <li>➤ 57 fishermen fell into the water because the boat sank/capsized. Reasons for the boat sinking/capsizing included:           <ul style="list-style-type: none"> <li>- Bad weather (n = 46);</li> <li>- Holes in or damage to boat (n = 6);</li> <li>- Collision with rocks (n = 3) or another boat (n = 1);</li> <li>- Unknown (n = 1).</li> </ul> </li> <li>➤ 6 fishermen fell or were accidentally knocked out of the boat due to:           <ul style="list-style-type: none"> <li>- Collision with another boat (n = 2);</li> <li>- Hippopotamus attack on the boat (n = 1);</li> <li>- Attempting to pull up the anchor (n = 1);</li> <li>- Being drunk (n = 1);</li> <li>- Epileptic fit (n = 1).</li> </ul> </li> <li>➤ 3 fishermen were pushed/forced into the water by another person due to:           <ul style="list-style-type: none"> <li>- Robbery (n = 1);</li> <li>- Other attack (n = 2).</li> </ul> </li> <li>➤ 1 fisherman purposefully entered the water as he heard hippopotamus noises and attempted to swim away.</li> </ul>
2 fishermen were on the lake shore prior to drowning.
<ul style="list-style-type: none"> <li>➤ In both cases, the victim purposefully entered the water due to:           <ul style="list-style-type: none"> <li>- Being drunk (n = 1);</li> <li>- Attempting to escape arrest (n = 1).</li> </ul> </li> </ul>
In 1 case, it is not known where the fisherman was prior to drowning, or the reason for drowning. His body was found when he was already dead, and the cause of death was thought to be drowning.
<b>ADULT COMMUNITY MEMBERS (N = 7)</b>
4 adult community members were in a boat on the lake prior to the drowning incident (3 travelling, and 1 working on a boat).
<ul style="list-style-type: none"> <li>➤ 3 adult community members fell into the water because the boat sank/capsized in bad weather.</li> <li>➤ 1 adult community member entered the water on purpose to clean the boat.</li> </ul>
1 adult community member was on the lake shore prior to drowning. He entered the water on purpose when drunk.
In 2 cases, it is not known where the adult community members were prior to drowning, or the reasons for drowning. Their bodies were found when they were already dead, and the causes of death were thought to be drowning (1 confirmed through post mortem).
<b>CHILD COMMUNITY MEMBERS (N = 9)</b>
1 child community member was on a boat on the lake prior to the drowning incident (travelling). She fell into the water as the boat collided with rocks and sank.
8 child community members were on the lake shore prior to drowning.
<ul style="list-style-type: none"> <li>➤ 6 child community members entered the water on purpose to:           <ul style="list-style-type: none"> <li>- Swim (n = 4);</li> <li>- Play (n = 2).</li> </ul> </li> <li>➤ In 2 cases, it is not known what the child community members were doing prior to drowning, or the reasons for drowning. Their bodies were found when they were already dead, and the causes of death were thought to be drowning (1 confirmed through post mortem).</li> </ul>

Table 4.13: Further circumstances of drowning deaths.

VARIABLE	FISHERMEN (N = 70)	ADULT COMMUNITY MEMBERS (N = 7)	CHILD COMMUNITY MEMBERS (N = 9)	TOTAL (N = 86)
<b>Body of water involved</b>				
Lake	70 (100%)	7 (100%)	9 (100%)	86 (100%)
<b>Time of drowning</b>				
Morning/afternoon	18 (26%)	2 (29%)	3 (33%)	23 (26%)
Evening	18 (26%)	2 (29%)	6 (66%)	26 (30%)
Night	34 (46%)	3 (43%)	0 (0%)	37 (43%)
<b>Lights available and on (for n = 37 who drowned at night time)</b>				
Yes	19 (56%)	0 (0%)	Not applicable	19 (51%)
No	10 (29%)	1 (33%)	Not applicable	11 (30%)
Don't know	5 (15%)	2 (67%)	Not applicable	7 (19%)
<b>Weather conditions</b>				
Strong winds/Heavy rain	39 (56%)	3 (43%)	0 (0%)	42 (49%)
Moderate winds/Light rain	17 (24%)	1 (14%)	1 (11%)	19 (22%)
Little or no wind/No rain	13 (19%)	3 (42%)	8 (88%)	24 (28%)
Don't know	1 (1%)	0 (0%)	0 (0%)	1 (1%)
<b>Water conditions</b>				
Rough	40 (57%)	3 (43%)	0 (0%)	43 (50%)
Moderate	11 (16%)	0 (0%)	1 (11%)	12 (14%)
Slight/Calm	18 (26%)	4 (57%)	8 (88%)	30 (34%)
Don't know	1 (1%)	0 (0%)	0 (0%)	1 (1%)
<b>Victim wearing lifejacket</b>				
Yes	2 (3%)	0 (0%)	0 (0%)	2 (2%)
No	68 (97%)	7 (100%)	9 (99%)	84 (98%)
<b>Victim under influence of alcohol</b>				
Yes	9 (13%)	3 (43%)	0 (0%)	12 (14%)
No	56 (80%)	4 (57%)	9 (99%)	69 (80%)
Don't know	5 (7%)	0 (0%)	0 (0%)	5 (6%)
<b>Victim under influence of drugs</b>				
Yes	4 (6%)	0 (0%)	0 (0%)	4 (5%)
No	59 (84%)	6 (86%)	9 (99%)	74 (86%)
Don't know	7 (10%)	1 (14%)	0 (0%)	8 (9%)

Of the children who drowned, only one had sought permission to go in or near the water and almost 80% were either not supervised or supervised by another child. There were no barriers preventing the children entering the lake.

In almost half of the drowning incidents, neither the victim nor any other person called for help. Of the 27 cases where the victim or someone else called for help, this was mostly done by shouting out. Very few people called someone using a mobile phone to request help, and most of those who did called the boat owner. Over 80% of the bodies of the drowning victims were recovered, but only 10% of victims were taken to a nearby health facility.

Table 4.14: Circumstances of drowning deaths involving boats.

VARIABLE	FISHERMEN (N = 67)	ADULT COMMUNITY MEMBERS (N = 4)	CHILD COMMUNITY MEMBERS (N = 1)	TOTAL (N = 72)
<b>Type of boat</b>				
Small fishing boat	56 (84%)	1 (25%)	0 (0%)	57 (79%)
Large fishing boat	11 (16%)	1 (25%)	1 (100%)	13 (18%)
Passenger ferry	0 (0%)	2 (50%)	0 (0%)	2 (3%)

Table 4.14 continued.

<b>Material boat made from</b>					
Wood	67 (100%)	4 (100%)		1 (100%)	72 (100%)
<b>Method of power</b>					
Engine	24 (36%)	3 (75%)		1 (100%)	28 (39%)
Sails	3 (4%)	0 (0%)		0 (0%)	3 (4%)
Oars	40 (60%)	1 (25%)		0 (0%)	41 (57%)
<b>Boat overcrowded (people)</b>					
Yes	1 (1%)	2 (50%)		0 (0%)	3 (4%)
No	65 (97%)	2 (50%)		1 (100%)	68 (94%)
Don't know	1 (1%)	0 (0%)		0 (0%)	1 (1%)
<b>Boat overloaded (other items)</b>					
Yes	5 (7%)	3 (75%)		0 (0%)	8 (11%)
No	58 (87%)	1 (25%)		1 (100%)	60 (83%)
Don't know	4 (6%)	0 (0%)		0 (0%)	4 (6%)
<b>Boat well maintained</b>					
Yes	44 (66%)	3 (74%)		1 (100%)	48 (67%)
No	10 (15%)	1 (25%)		0 (0%)	11 (15%)
Don't know	13 (19%)	0 (0%)		0 (0%)	13 (18%)

Table 4.15: Circumstances of drowning deaths involving children.

VARIABLE	CHILD COMMUNITY MEMBERS (N = 9)
<b>Person supervising child at time of incident</b>	
Family member or Friend, adult	2 (22%)
Family member or friend, child	3 (33%)
No one	4 (44%)
<b>Permission sought from caregiver to go in/near water</b>	
Yes	1 (11%)
No	5 (55%)
Don't know	3 (33%)
<b>Barrier(s) available to prevent child entering water</b>	
Yes	0 (0%)
No	8 (88%)
Don't know	1 (11%)

Table 4.16: Calling for help and recovery of body.

VARIABLE	FISHERMEN (N = 70)	ADULT COMMUNITY MEMBERS (N = 7)	CHILD COMMUNITY MEMBERS (N = 9)	TOTAL (N = 86)
<b>Help called for</b>				
Victim called for help	6 (9%)	1 (14%)	0 (0%)	7 (8%)
Other person called for help*	12 (17%)	1 (14%)	3 (33%)	16 (19%)
Victim and other person called for help	3 (4%)	0 (0%)	1 (11%)	4 (5%)
No one called for help	33 (47%)	5 (71%)	4 (44%)	42 (49%)
Don't know	16 (23%)	0 (0%)	1 (11%)	17 (20%)
<b>Method of calling for help (of n = 27 who called for help)</b>				
Using a mobile phone	6 (29%)	0 (0%)	1 (25%)	7 (26%)
By shouting for help	15 (71%)	1 (50%)	3 (75%)	19 (70%)
Other*	0 (0%)	1 (50%)	0 (0%)	1 (3%)

Table 4.16 continued.

Person/organisation(s) called (of n = 7 who called for help using a mobile phone)				
Family member	1 (14%)	Not applicable	0 (0%)	1 (14%)
Fisherman	2 (29%)	Not applicable	0 (0%)	2 (29%)
Boat owner	3 (43%)	Not applicable	1 (14%)	4 (57%)
BMU	1 (14%)	Not applicable	0 (0%)	1 (14%)
Rescue service	0 (0%)	Not applicable	0 (0%)	0 (0%)
Community leader	1 (14%)	Not applicable	0 (0%)	1 (14%)
Body recovered				
Yes	59 (%)	4 (57%)	7 (77%)	70 (81%)
No/unknown	11 (%)	3 (43%)	2 (22%)	16 (19%)
Victim taken to health facility				
Yes	4 (6%)	3 (43%)	2 (22%)	9 (10%)
No	65 (93%)	4 (57%)	7 (77%)	76 (88%)
Don't know	1 (1%)	0 (0%)	0 (0%)	1 (1%)

\*For cases where the victims were fishermen, calls for help were made by fellow fishermen/colleagues (n = 14) and a community church member. In one case in which an adult community member drowned, a fisherman called for help by reporting the incidence to the BMU. In three cases where children drowned, adult bystanders called for help; in one case, other children called for help.

## 4.6 Discussion

In this chapter, under objective 2a, we sought to identify common characteristics among drowning victims, and common factors in the circumstances that led to the drowning deaths, the overarching purpose being to highlight risk factors for drowning among fishing communities on the Tanzanian shores of Lake Victoria.

Of the 86 drowning deaths occurring in the targeted communities over the past two years, the majority (over 80%) were among fishermen, all of whom were male. Of the seven other adult community members who drowned, 70% were also male; among children, however, most drowning victims were female. The majority of deceased fishermen and other adult community members were aged between 18 and 40 years. All deceased children were aged 10 years or younger. These data highlight a uniqueness in the populations targeted in this study; while most deaths in the current study were among adults aged 18 years and older, the majority of deaths worldwide are in persons aged 25 and under, with one to four-year olds being most at risk<sup>1</sup>.

Other demographics of the population who had drowned (such as tribe, religion, marital status and links to community) were very similar to the demographics of the survey populations in objective 2b (Chapter 5), and thus the deceased population is likely to be reasonably representative of the fishing communities.

Among the fishermen who drowned, most had worked in the industry for at least a year (with the highest percentage working in the industry for five to 10 years), and thus inexperience was likely not a significant factor leading to the death. It was reported that almost two thirds of fishermen who drowned were unable to swim, but less than five per cent owned or used a lifejacket while fishing. These data are different to data collected from fishermen in the survey for objective 2b, in which almost 80% reported that they could swim, and over 10% said they owned and wore a life jacket. This may highlight inability to swim and lack of lifejacket use as risky behaviours among the drowning victims. However, responses may be affected by responder and/or recall bias, with self-reported swimming ability and life jacket use perhaps likely to be higher.

The majority of deceased fishermen commonly fished at night, and from a boat. In all cases where victims fished from boats, the material the boat was made from was wood, but this is typical for these communities. In over half the cases, the method of power of the boats most commonly used was oars. This is different to reports received from fishermen taking part in the survey for objective 2b, where the most common mode of power was engine. Given the recency of the deaths, this is unlikely to reflect an advance in technology used in these communities. It may instead reflect a higher risk of drowning among fishermen who fish from boats powered by oars. Boat overloading was not a common factor in

routine fishing practices of deceased fishermen. However, over a third were reported to fish from poorly maintained boats.

There are other characteristics among the deceased fishermen that differ from the fisherman survey population in objective 2b: fewer of the deceased fishermen ever took a mobile phone with them when fishing; more deceased fishermen went fishing in bad weather; and fewer deceased fishermen returned to shore if weather turned bad while fishing. Drug and alcohol use while fishing were reportedly higher in the population of deceased fishermen than self-reported by fishermen under objective 2b; but similar to reports by fishermen of their colleagues under objective 2b.

Characteristics and water-based practices of other community members who drowned were very similar to those of the community member survey participants under objective 2b, although more of the deceased population went in or near water in the evening, whereas the survey population reported going more commonly in the morning. Also, a much lower proportion of the deceased population were reportedly able to swim. Alcohol use when in or near water was reportedly much higher among deceased community members than in survey participants, but this may reflect greater honesty in answering this question on behalf of someone else compared to one's self.

While it is perhaps informative to draw these comparisons between the deceased population and the survey populations, it must be considered that some of these responses (for both fishermen and other community members) may be affected by recall and/or responder bias.

The age range of the deceased children is lower than that of the child population described in the surveys under objective 2b, making it more difficult to draw comparisons between the two populations. Many of the children who drowned did not go in or near the water on routine basis. However, of those who did, many would not ask permission to go in or near the water, only few would be supervised, and none would wear a life jacket.

All drowning deaths in the current study occurred in the lake. From examining the circumstances of the deaths, it was clear that most (over 80%) occurred while the victim was on a boat. In 90% of these cases, the victim was fishing; in 10% they were travelling or patrolling the lake. This is different to findings by Kobusingye *et al.*, who found that over half of deaths on the Ugandan side of the lake were during transportation and 40% occurred while fishing<sup>3</sup>. However, this may be due to fewer transportation boats available in the rural communities included in the current study. In most cases identified in the current study, the victim was in a small fishing boat, powered by oars. As in the Ugandan study, most deaths occurred because the boat sank or capsized due to bad weather and rough water conditions, although we also encountered cases where the boat sank due to collision with rocks or another boat. Overcrowding and overloading were not frequently reported in the current study, and poor boat maintenance was only reported as a factor in 15% of drowning cases.

While animals were involved in two deaths in the current study, the cause of death in both cases was still considered to be drowning. In one case, a hippopotamus attacked a fishing boat, causing the fishermen to fall in the water. Other fishermen in the boat managed to swim to safety, but one drowned. In the other case, fishermen in a boat heard the noise of a hippopotamus and jumped into the water in an attempt to swim away. Again, while other fishermen managed to get to safety, one drowned. Similarly, three fishermen died during a robbery or other attack. However, the cause of death in all cases was considered to be drowning as the robbers/attackers forced the victims to get into the water, and they were unable to swim to safety. The robbers/attackers did not hold the fishermen under the water or injure them in any other way.

A high proportion of all deaths identified in the current study occurred at night and, in over half of these cases, there were no lights available. Only two per cent of the victims were wearing lifejackets at the time of death. Fourteen per cent were reportedly under the influence of alcohol, but very few under the influence of drugs.

When looking specifically at the drowning events among children, it is clear that the circumstances typically differ from those of the adult deaths. Two thirds of children in the current study drowned while swimming or playing at the shore. In most cases, the child had not sought permission to go in or near the lake and was not being supervised by an adult. No barriers were reported that were aimed at preventing children entering the water at the locations where they drowned.

Of all incidents described in the current study, the victim or another person called for help in only 30%, and this was mostly just by shouting. Calling for help using a mobile phone appeared to be uncommon.

This is a highly unique dataset, providing detailed information on the characteristics of a significant number of drowning victims and the circumstances of their deaths. We limited collection of data on drowning deaths to those occurring in the past two years, primarily to avoid potential effects of recall bias on the incidence estimations (objective 1, chapter 3). The additional benefit of this approach under objective 2a is that reported characteristics and routine water-based practices of the drowning victims are likely to be 'current' and reflect those of fishing communities today. Observing drowning deaths from previous years may provide less useful information if practices and technologies from those times are outdated.



## CHAPTER 5: RISK FACTORS FOR DROWNING AMONG FISHERMEN AND THE WIDER LAKESIDE COMMUNITIES

### 5.1 Overview

While objective 2a of the current study aimed to identify common risk factors among drowning deaths in the communities, we also considered it important to examine the common practices among fishermen and other communities that might put them at increased risk of drowning. This is important if the ultimate goal is to assess and implement drowning prevention strategies. For example, an intervention aimed at improving lifejacket usage will likely be ineffective if most fishermen already wear them.

For objective 2b of the current study, we aimed to identify risk-taking behaviours among fishermen and other members of communities on the Tanzanian shore of Lake Victoria that might put them at increased danger of drowning. We also sought to evaluate how fishermen and other community members perceive these risk factors, and their beliefs about why drowning incidents occur and whether they can be avoided. We took multiple approaches to achieve this.

First, we asked fishermen and other community members at each study site to complete a questionnaire (Appendix 4). For fishermen, we asked about routine fishing practices, and for other community members we asked about their routine practices involving water. For community members who are caregivers of children, we also asked about the children's routine practices involving water.

Secondly, we conducted observational analyses of routine fishing practices and risk-taking behaviours. At each site we watched fishing boats as they were departing and returning, and recorded observations on the boats themselves (what they were made of, how they were powered etc) and the people on the boats (how they embarked/disembarked, whether they were wearing lifejackets etc) using a pre-defined observation chart (Appendix 4).

Finally, at each site a team of qualitative Research Assistants conducted IDIs and FGDs with fishermen and other community members. Participants were asked (1) what risks they associate with living and working near the lake, (2) whether they consider drowning to be a problem in their community, (3) what risk factors in their community put people at risk of drowning, (4) how the risk of drowning compares for different sub-populations (fishermen, children, women), (5) which drowning risk factors are under our control, and which are not, and (6) whether people in their community have any other (religious/superstitious/magic) beliefs about drowning. IDIs and FGDs were conducted using pre-constructed prompt sheets (both in Appendix 5).

### 5.2 Self-reported risk factors for drowning from participant surveys

#### Participant demographics

Demographic details of the 601 survey participants are shown in Table 5.1. Fishermen accounted for approximately half of respondents, and other community members made up the other half. Twenty-five per cent of the community members worked in other jobs within the fishing industry. All fishermen were male, whereas half of the community members were female. The ages of the two populations were similar. Most participants were Catholic or other Christian, were permanent residents in the community (as opposed to temporary) and were married. The average number of children and other dependents were three and one, respectively, for both groups.

#### Routine fishing practices among fishermen

Table 5.2 shows the routine fishing practices of the 300 fishermen participating in the survey. The average amount of time worked in the fishing industry was 10 years. Approximately equal numbers fished with nets versus line and hook, almost all fish from a boat, and 75% fished at night. On average, fishermen went fishing 12 times per month.



Table 5.1: Demographic characteristics of survey participants.

VARIABLE		FISHERMEN (N = 300)	COMMUNITY MEMBERS (N = 301)	TOTAL (N = 601)
<b>Gender</b>				
	Male	300 (100%)	146 (49%)	446 (74%)
	Female	0 (0%)	155 (52%)	155 (26%)
<b>Age (years)</b>				
	Mean	36	37	36
	Median	36	37	36
	Range	18 – 68	18 – 70	0 - 70
<b>Race</b>				
	Black African	300 (100%)	301 (100%)	601 (100%)
<b>Community</b>				
	Kijiwani	49 (16%)	51 (17%)	100 (17%)
	Ghana	51 (17%)	50 (17%)	101 (17%)
	Kasenyi	26 (9%)	26 (9%)	52 (9%)
	Chifule Ukara	49 (16%)	51 (17%)	100 (17%)
	Ruhanga	51 (17%)	49 (16%)	100 (17%)
	Kayenze	24 (8%)	24 (8%)	48 (8%)
	Chakazimbwe	25 (8%)	25 (8%)	50 (8%)
	Bezi Kisiwani	25 (8%)	25 (8%)	50 (8%)
<b>Tribe</b>				
	Mzinza	17 (6%)	16 (5%)	33 (5%)
	Mhaya	59 (20%)	62 (21%)	121 (20%)
	Mjalu	23 (8%)	5 (2%)	28 (5%)
	Mjita	48 (16%)	24 (8%)	72 (12%)
	Msukuma	39 (13%)	70 (23%)	109 (18%)
	Mkara/Mkerewe	42 (14%)	35 (12%)	77 (13%)
	Mkuria/Mshashi	25 (8%)	11 (4%)	36 (6%)
	Other	47 (16%)	78 (26%)	125 (21%)
<b>Religion</b>				
	Catholic	135 (45%)	121 (40%)	256 (43%)
	Muslim	55 (18%)	69 (23%)	124 (21%)
	Anglican	7 (2%)	15 (5%)	22 (4%)
	Other Christian	97 (32%)	93 (31%)	190 (32%)
	No religion/Other	6 (2%)	3 (1%)	9 (1%)
<b>Primary occupation</b>				
	Fisherman	300 (100%)	0 (0%)	300 (50%)
	Other fishing industry	0 (0%)	77 (26%)	77 (13%)
	Farming	0 (0%)	54 (18%)	54 (9%)
	Teacher/Education	0 (0%)	5 (2%)	5 (1%)
	Vendor	0 (0%)	26 (9%)	26 (4%)
	Food/catering	0 (0%)	13 (4%)	13 (2%)
	Craftsmanship	0 (0%)	21 (7%)	21 (3%)
	Health/Medicine	0 (0%)	3 (1%)	3 (0%)
	Other, employed	0 (0%)	85 (28%)	85 (12%)
	Unemployed	0 (0%)	17 (6%)	17 (3%)
<b>Married</b>				
	Yes	237 (79%)	200 (66%)	437 (73%)
	No*	63 (21%)	101 (34%)	88 (15%)

Table 5.1 continued.

<b>Link to community</b>			
Born and live in community	34 (11%)	43 (14%)	77 (13%)
Born elsewhere, live in community	195 (65%)	209 (69%)	404 (67%)
Visiting community for work	71 (24%)	49 (16%)	120 (20%)
<b>Years spent in community (of n = 524 not born in community)</b>			
Mean	7	9	8
Median	5	7	6
Range <sup>^</sup>	0 – 36	0 – 47	0 - 47
<b>Number of children</b>			
Mean	3	3	3
Median	3	3	3
Range	0 – 16	0 – 14	0 - 16
<b>Number of other dependents</b>			
Mean	2	1	2
Median	1	1	1
Range	0 – 15	0 – 9	0 - 15

\*401 participants (200 fishermen; 201 other communities) were asked for further details regarding their marital status. Of those not married: 66 reported being single (fishermen: 33; community members: 33); 29 divorced (fishermen: five; community members: 24); and 10 widowed (fishermen: one; community members: nine).

<sup>^</sup>Whole years are shown. Minimum time is three months for fishermen; six months for community members.

Table 5.2: Fishing practices of fishermen.

<b>VARIABLE</b>	<b>FISHERMEN (N = 300)</b>	
<b>Years worked in fishing industry</b>		
Mean	11	
Median	10	
Range*	0 – 40	
<b>Type of fish</b>		
Dagaa	128 (43%)	
Other fish	204 (68%)	
<b>Fishing method</b>		
Nets	140 (47%)	
Line and hook	128 (43%)	
Both	32 (11%)	
<b>Time of fishing</b>		
Daytime	76 (25%)	
Night time	152 (51%)	
Both	72 (24%)	
<b>Fishing location</b>		
Boat	293 (98%)	
Shore	1 (0%)	
Both	6 (2%)	
<b>Estimated number of fishing trips per month</b>		
Mean	13	
Median	12	
Range	2 – 28	

\*Whole years are shown. Minimum time is four months.

Table 5.3 shows the boating practices of fishermen last time they went fishing (for the n = 299 who fish on a boat). In all cases, the boat was made of wood, and in most, it was powered by an engine. Few fishermen reported fishing from boats overloaded with people or other items. However, 30% said that the boat was not well maintained.

Almost 80% of fishermen said they could swim, but only 11% reported owning or using a lifejacket last time they went fishing (Table 5.3). Forty-five fishermen reported using other types of buoyancy devices, but these tended to be plastic containers and logs rather than purpose-made buoyancy devices. Only one fisherman reported taking a life ring when he went out fishing.

Table 5.3: Practices of fishermen during most recent fishing trip on boat.

VARIABLE	FISHERMEN USING BOATS (N = 299)	
<b>Type of boat</b>	Wooden	299 (100%)
<b>Method of power</b>	Engine	189 (63%)
	Sails	13 (4%)
	Oars	97 (32%)
<b>Boat overcrowded (with people)</b>	Yes	5 (2%)
	No	295 (98%)
<b>Boat overloaded</b>	Yes	11 (4%)
	No	288 (96%)
<b>Boat well maintained</b>	Very well	54 (18%)
	Adequately	155 (52%)
	Not very well	75 (25%)
	Not at all	15 (5%)

Table 5.4: Ability to swim; and use of buoyancy devices when fishing.

VARIABLE	FISHERMEN (N = 300)	
<b>Ability to swim</b>	Yes	236 (79%)
	No	64 (21%)
<b>Own a life jacket</b>	Yes	33 (11%)
	No	267 (89%)
<b>Used lifejacket last time went fishing</b>	Yes	34 (11%)
	No	266 (89%)
<b>Other type(s) of buoyancy device available</b>	Yes*	45 (15%)
	No	255 (85%)

\*Other types of device used include: large plastic containers/drums, such as empty fuel containers; a wooden log; the boat; life ring; fish bucket.

Table 5.5 shows mobile phone usage among fishermen while fishing. Almost all fishermen reported that mobile phone signal is available at least some of the time while fishing; yet a quarter did not take a phone last time they went fishing. Of the 224 fishermen that took a phone, most did not take a smart phone. Twenty-five per cent reported having an emergency contact saved in their phone; contacts included family members, colleagues, boat owners, BMUs, community leaders, friends and supervisors. A third have previously called for help using their mobile when they felt unsafe while fishing. In over half of cases, the person called was the boat owner.

Whilst almost three-quarters of fishermen reported not going out fishing in bad weather, less than 40% return to shore if the weather turns bad (Table 5.6). The majority of fishermen learnt the weather forecast before and while fishing by

observing the sky and conditions. Very few obtained the weather forecast via the radio, television or another reputable source.

Only three per cent of fishermen reported ever drinking alcohol before or while fishing, and only one reported doing so last time he went fishing (Table 5.7). However, over 20% said that at least one other fisherman in their boat was drinking alcohol. Similarly, only three per cent said they took drugs last time they went fishing but almost 20% said another fisherman in their boat took marijuana.

Table 5.8 shows fishermen's responses to questions asked about drowning first response and first aid. When asked what they would do if they saw a fellow fisherman in trouble in the water, almost 50% correctly said they would throw an item that floats to the victim. However, 44% said they would jump in the water to save the victim. When asked what two factors should first be established in a suspected drowning victim, almost 70% responded with 'whether he is breathing', but only 22% said 'whether his heart is beating' and 43% said 'where his family are'. When asked whether a fisherman who almost drowned (but is now conscious and breathing) should go to hospital, over a quarter said no.

Table 5.5: Mobile phone communication while fishing.

VARIABLE	FISHERMEN (N = 300)
<b>Signal availability while fishing</b>	
Most of the time	95 (32%)
Sometimes	175 (58%)
Never	7 (2%)
Don't know	23 (8%)
<b>Took a mobile phone last time went fishing</b>	
Yes	224 (75%)
No	76 (25%)
<b>Type of phone taken (of n = 224 who took a phone)</b>	
Smart phone	20 (9%)
Other phone	204 (91%)
<b>Emergency contact saved in phone (of n = 224 who took a phone)</b>	
Yes*	55 (25%)
No	169 (75%)
<b>Ever called someone from a phone if felt unsafe</b>	
Yes	99 (33%)
No	201 (62%)
<b>Person/organisation called (of n = 99 who called for help)</b>	
Family member	34 (34%)
Another fisherman	43 (43%)
Boat owner	55 (55%)
BMU	7 (7%)
Other^	2 (2%)

\*Emergency contacts included family members, colleagues, boat owners, BMU, community leaders, friends and supervisors.

^Other people called included a fish seller and a fishing company's agent.

Table 5.6: Weather conditions and fishing activities.

VARIABLE	FISHERMEN (N = 300)
<b>Go fishing in bad weather</b>	
Yes	85 (28%)
No	215 (72%)

Table 5.6 continued.

<b>Ever return if weather turns bad</b>	
Yes	184 (61%)
No	116 (39%)
<b>Source of weather forecast before fishing</b>	
Radio/television	21 (7%)
Sky/weather condition observations	266 (89%)
Other*	1 (0%)
Do not look at weather forecast	12 (4%)
<b>Source of weather forecast while fishing</b>	
Radio	1 (0%)
Sky/weather condition observations	288 (96%)
Do not look at weather forecast	11 (4%)

\*The other method used was not reported.

Table 5.7: Drug and alcohol use while fishing.

<b>VARIABLE</b>	<b>FISHERMEN (N = 300)</b>
<b>Ever drunk alcohol while fishing</b>	
Yes	10 (3%)
No	290 (97%)
<b>Drank alcohol last time fished</b>	
Yes*	1 (0%)
No	299 (100%)
<b>Co-worker drank alcohol last time fished</b>	
Yes	63 (21%)
No	237 (79%)
<b>Took drugs last time fished</b>	
Yes^	8 (3%)
No	282 (97%)
<b>Co-worker took drugs last time fished</b>	
Yes	55^ (18%)
No	245 (82%)

\*One fisherman reported drinking one alcoholic drink last time he went fishing.

^In all cases, the drug taken was marijuana.

Table 5.8: Knowledge on drowning first response and first aid.

<b>VARIABLE</b>	<b>FISHERMEN (N = 300)</b>
<b>First response upon seeing someone in trouble in water</b>	
Jump in and pull victim to safety	133 (44%)
Throw floating item to victim	144 (48%)
Leave scene and call for help	23 (8%)
<b>First two things to establish in fisherman suspected of drowning</b>	
Why he drowned	94 (31%)
Whether he is breathing	205 (68%)
Whether he has any cuts/bruises	34 (11%)
Whether his heart is beating	67 (22%)
Where his family is	128 (43%)
Other*	72 (24%)
<b>Fishermen who nearly drowned should go to hospital</b>	
Yes	220 (73%)
No	80 (27%)

*\*Other answers included: Call/ask for help; call/inform BMU/community leader/police authorities; take him out of the water; take him to hospital; perform first aid; save/rescue/help him; take him to a safe place; put him close to a fire; call other people to witness; leave the scene to avoid answering questions.*

### Routine water-based practices among other community members

Table 5.9 shows routine water-based practices among other community members (n = 301) participating in the survey. Most respondents reported going in or near the water every day, and the most common reasons were to buy or sell fish, to travel, to wash clothes or other items, to collect water, and for other work. Most went in or near the water in the daytime, but almost a quarter reported going at night. Over half of the community members said that they could not swim, yet less than 10% wore a lifejacket last time they went in or near the water. Over half of respondents said they go in or near the water in bad weather. Very few community members reported drinking alcohol last time they went in or near the water, and none reported using drugs. Almost a quarter reported calling for help when they felt unsafe when in or near the water, and in most cases they did so by shouting out.

Table 5.10 shows community member responses to questions asked about drowning first response and first aid. When asked what they would do if they saw someone in trouble in the water, only 22% correctly said they would throw an item that floats to the victim. Over half said they leave the scene to find help. When asked what two factors should first be established in a child suspected of drowning, almost 60% responded with 'whether he/she is breathing', but less than a quarter said 'whether his/her heart is beating'. Over half said 'where his/her family are'. When asked whether a neighbour who almost drowned (but is now conscious and breathing) should go to hospital, most said no.

Table 5.9: Water-based practices of adult community members.

VARIABLE	ADULT COMMUNITY MEMBERS (N = 301)
<b>Number of days go in/near water per week</b>	
Mean	6
Median	7
Range	0 – 7
<b>Reason(s) for going in/near water</b>	
To wash themselves/someone else	159 (53%)
To wash clothes/other items	217 (72%)
To travel	232 (77%)
To collect water	209 (70%)
To buy or sell fish	279 (93%)
For other work	26 (86%)
To swim or for other recreation	84 (28%)
<b>Time(s) of day go in/near water</b>	
Morning	270 (90%)
Afternoon	209 (69%)
Evening	141 (47%)
Night	73 (24%)
<b>Took light last time went in/near water at night (of n = 73 going at night)</b>	
Yes	48 (66%)
No	25 (34%)
<b>Ability to swim</b>	
Yes	135 (45%)
No	166 (55%)
<b>Wore a lifejacket last time went in/near water</b>	
Yes	20 (7%)
No	281 (93%)

Table 5.9 continued.

<b>Go in/near water in bad weather</b>	
Yes	156 (52%)
No	145 (48%)
<b>Drank alcohol last time went in/near water</b>	
Yes	3 (1%)
No	298 (99%)
<b>Took drugs last time went in/near water</b>	
Yes	0 (0%)
No	301 (100%)
<b>Ever called for help when felt unsafe</b>	
Yes	71 (24%)
No	230 (76%)
<b>Method of calling for help (of n = 71 who called for help)</b>	
Using a mobile phone	15 (21%)
Shouting for help	49 (69%)
Raising or waving hands/other item*	7 (10%)

\*One raised the oars of their boat; one raised their hands; four waved a cloth; one raised their hands and a cloth.

Table 5.10: Knowledge on drowning first response and first aid.

VARIABLE	COMMUNITY MEMBER (N = 301)
<b>First response upon seeing someone in trouble in water</b>	
Jump in and pull victim to safety	69 (23%)
Throw floating item to victim	65 (22%)
Leave scene and call for help	167 (55%)
<b>First two things to establish in child suspected of drowning</b>	
Why he/she drowned	80 (27%)
Whether he/she is breathing	178 (59%)
Whether he/she has any cuts/bruises	28 (9%)
Whether his/her heart is beating	72 (24%)
Where his/her family is	159 (53%)
Other*	85 (28%)
<b>Neighbour who nearly drowned should go to hospital</b>	
Yes	225 (75%)
No	76 (25%)

\*Other answers included: calling for help; informing the police/local authority; searching for dead bodies; discouraging illegal fishing activities; creating a fine to warn the victim; taking the victim to hospital.

### Routine water-based practices among children in the community

Table 5.11 shows routine water-based practices of children cared for by the community member survey respondents. Questions in this section were answered by the adult community member caregivers. Almost all community members reported that there are no barriers in their community preventing children going in or near large water bodies. Of the three respondents who said that barriers were present, none reported physical barriers; two said that there were restrictions imposed by parents and one said there were security guards.

The average number of children cared for on a regular basis by the community members (including their own children and/or other children) was one. In total, 333 children were cared for by the 301 community members, and the average age of the children was six years. Of the 333 children, less than 20% were able to swim but almost two thirds went in or near the water at least once per week. The primary reasons included to wash themselves or someone else, to wash clothes or other items, to collect water, and to swim or play (or for other recreation). The respondent was with the child last time they went in/near the water in only 16% of cases. Of the 237 children who were not with the respondent, only

11% were supervised by another adult. Only one per cent of children used a lifejacket last time they went in or near the water.

Table 5.11: Water-based practices of child community members.

VARIABLE	COMMUNITY MEMBERS (N = 301)
<b>Barriers preventing children going in/near water in community</b>	
Yes*	3 (1%)
No	298 (99%)
<b>Number of children &lt;16y cared for by respondent</b>	
Mean	1
Median	1
Range	0 – 5
Total number across population	333
<b>OF 333 CHILDREN CARED FOR BY SURVEY PARTICIPANTS:</b>	
<b>Age of child (years)</b>	
Mean	7
Median	6
Range^	0 – 15
<b>Ability to swim</b>	
Yes	63 (19%)
No	270 (81%)
<b>Number of days go in/near water per week</b>	
Less than once per week	122 (37%)
1 to 3 times per week	70 (21%)
4 or more times per week	141 (43%)
<b>Reason(s) for going in/near water</b>	
To wash themselves/someone else	104 (31%)
To wash clothes/other items	95 (29%)
To travel	62 (19%)
To collect water	129 (29%)
To buy or sell fish	11 (3%)
For other work	3 (1%)
To swim or play/Other recreation	84 (25%)
To fish from the shore	4 (1%)
To meet with or accompany caregiver	7 (2%)
<b>Respondent with child last time in/near water</b>	
Yes	53 (16%)
No	237 (71%)
Not applicable	43 (13%)
<b>Other supervisor present (of n = 237 cases where respondent was not there)</b>	
Another adult	26 (11%)
Another child	91 (38%)
No one	93 (39%)
Don't know	27 (11%)
<b>Child used a lifejacket last time they were in/near water</b>	
Yes	2 (1%)
No	287 (86%)
Not applicable	44 (13%)

\*In two cases the barrier reported was parent restrictions on children going in or near the water; in the other case the barrier reported was security guards. No physical barriers were reported.

^Whole years are shown. The youngest child reported by a study participant was two months.

### 5.3 Researcher-reported risk factors for drowning from fishing boat observations

The team conducted observations at each community on 10 boats embarking and departing (mostly at sunset), and 10 boats disembarking and returning (mostly at sunrise). It cannot be confirmed that these were the same boats were departing and returning and therefore the data have not been combined.

Table 5.12: Observations of fishing boats at departure and return.

VARIABLE	BOATS DEPARTING (N = 80)	BOATS RETURNING (N = 80)
<b>Time of day</b>		
Morning	30 (38%)	50 (63%)
Afternoon/Evening	50 (63%)	30 (38%)
<b>Size of boat</b>		
Small (capacity <5)	29 (36%)	40 (50%)
Mid-sized (capacity 5-10)	51 (64%)	40 (50%)
<b>Material boat made from</b>		
Wood	80 (100%)	80 (100%)
<b>Method of power</b>		
Engine	48 (60%)	42 (53%)
Sails	3 (4%)	12 (15%)
Oars	29 (36%)	26 (33%)
<b>Boat adequately maintained</b>		
Yes	42 (52%)	37 (46%)
No	38 (48%)	43 (54%)
<b>Overloading of boat (people)</b>		
Yes	0 (0%)	6 (8%)
No	80 (100%)	74 (92%)
<b>Overloading of boat (other items)</b>		
Yes	2 (3%)	0 (0%)
No	78 (97%)	100 (0%)
<b>Method of (dis)embarkation</b>		
Directly from shore	60 (75%)	54 (68%)
Via other boats	8 (10%)	10 (13%)
By wading/swimming	12 (15%)	16 (20%)
<b>Lifjacket use</b>		
All passengers on boat	1 (1%)	4 (5%)
At least 1 passenger on boat	1 (1%)	0 (0%)
No passengers on boat	78 (98%)	76 (95%)
<b>OF THE N = 50 BOATS OBSERVED DEPARTING IN THE EVENING AND N = 50 BOATS RETURNING IN THE MORNING:</b>		
<b>Fishing lanterns available onboard</b>		
Gas lanterns onboard	18 (36%)	17 (34%)
No lanterns on board	32 (64%)	33 (66%)
<b>Lights available onboard</b>		
Other lights on board	7 (14%)	18 (36%)
No other lights on board	43 (86%)	32 (64%)

There was an approximately equal split of small and mid-sized fishing boats observed. All were made from wood. The primary mode of power was engine, followed by oars. Only approximately half of boats were considered by the researchers to be adequately maintained, but very few boats were overloaded with people (ascertained by comparing boat capacity versus the number of people onboard) or other items. Most people were able to get on or off the boats directly from/to the shore (or off/onto rocks), but around 15-20% had to wade or swim in the water. In at least 95% of the boats observed, no passengers were wearing lifejackets. Of the 50 boats observed departing in the evening and the

50 returning in the morning (i.e. those fishing at night), only approximately one third had fishing lanterns visible on board. Similarly, only a small proportion had any other types of light on board.

## 5.4 Perceived risk factors from in depth interview and FGDs

### Brief demographics of respondents

A total of 30 in depth interviews were conducted across eight fishing communities (Bezi Kisiwani, Chakazimbwe, Chifule Ukara, Ghana, Kasenyi, Kayenze, Kijiweni, Ruhanga). Participants (22 male; eight female) included 11 fishermen, six boat owners, and 13 other community members. Ages ranged from 24 to 51 years (median 37).

Six FGDs, each including eight to 10 participants, were conducted across six fishing communities (Chifule Ukara, Ghana, Kasenyi, Kayenze, Kijiweni, Ruhanga; one per study site). The total number of participants was 51 (37 male; 14 female), and ages ranged from 22 to 54 years (median 37). Most (n = 30) were fishermen, but other community members (n = 21) were also included. Of the other community members, one was a boat owner and six others also worked in the fishing industry.

Focus group and interview findings were similar so have been reported together.

### Thematic findings: perceived risk factors of drowning among fishermen

During IDIs and FGDs, fishermen were perceived to be at higher risk of drowning compared to women and children. Their risk was mostly considered higher because they spend most time in the water and are more likely to encounter water accidents. Women's risk was considered most likely to occur when using marine transport.

During the IDIs and FGD, several risk factors for drowning among fishermen were discussed. The most commonly cited risk factors were (1) bad or unpredictable weather conditions, (2) poorly maintained and/or boats, (3) lack of life jackets, (4) Lack of swimming skills, and (5) alcohol or drug intoxication.

#### *Bad or unpredictable weather*

Bad or unpredictable weather conditions were described as the major cause of drowning accidents by most participants. Bad weather was described as a storm, strong wind, heavy rainfall and thunder, which may occur suddenly in the lake.

*"I would like to make you understand why most people drown in these shore areas. The first cause is bad weather. There can be storms and strong winds that de-stabilize the canoes and cause some to break or capsize and endanger the lives of the fishermen."* (FGD\_1, Chifule Ukara)

*"The first big cause of danger is the winds, followed by rain. When you go to the lake you can be surprised that you have left in the morning when the weather is calm. But my God! You know the rain may start from Musoma with winds which are very harsh. Our boats are not very safe, especially in harsh winds; they cause huge waves while our boats are small. That is when water enters in the boat. So the young men should always remember to carry containers that they will use to draw water out of the boat. And at that time there may be four or five fishermen and they have probably loaded the fish already. And in most cases, fishermen never let go of their fish. It is his money; he must protect it. And that may lead to drowning."* (IDI\_1, Base Kisiwani)

Unreliable weather forecast was also highlighted by several participants. The majority of the fishermen assess the weather by looking at the sky or observing the lake. They may face a sudden weather change in the lake.

*"It is a big problem ...to get a weather forecast that, in certain zones, there will be strong wind, rain. That will be of big help because you will know in advance that tomorrow will experience strong winds. They provide weather forecast in foreign countries about the coming storms in certain areas so people living alongside the lake shore can take precaution."* (IDI\_1, Kasenyi)

*“There are many reasons for instant storms, strong winds. The stormy weather may start suddenly. When you have all gone to work without knowing the weather forecast, something might go wrong when you are in the lake; maybe a strong wind blows across suddenly.” (IDI\_1, Chakazimbwe)*

### *Poorly maintained and/or small boats*

Using poorly maintained or small boats was discussed by the majority of participants across all sites as a risk factor for drowning in the lake. A weak boat with rotten timber could easily break when knocked by the waves. Poverty was seen as one of the factors that influenced the majority of fishermen to use a poorly maintained boat, and for inability to construct good and big boats

*“In most cases you can find that their boats are in poor condition. Some are broken. A fisherman goes to the lake without caring if the boat is broken. He is thinking of fish, that is all.” (IDI\_1, Chifule Ukara)*

*“Others may use poorly maintained boats and the boat owners are not willing to repair them. But they have to go because it is their job.” (IDI\_1, Ruhanga)*

*“Because there are people who craft temporary boats in order to earn some income, the boats are not up to standard. And remember there are strong winds that cause huge waves in the lake; these waves can destroy your boat if it is not stable.” (IDI\_1, Bezi kisiwani)*

*“Another factor is the water vessels being used by these fishermen. They are weak and not well constructed to meet the right standards. The weak boat exposes them to danger, especially when it becomes stormy.” (IDI\_1, Ghana)*

Using small boats like dhows or rowing boats was also discussed by several participants as more risky than big boats that use engines. Small boats could be easily overcome by the big waves and could not load large amounts of fish. The use of small boats differed from sites to site, and according to the type of fish caught.

*“Well some of their vessels are not steady in water. You might find others with small dhow boats. They are not safe. Sometime back, some group came here and registered some fishermen, promising them that they would soon bring us engines for our boats. They made the future look bright for us, but they never came back.” (IDI\_1, Bezi Kisiwani)*

*“What causes the fishermen to drown is mostly their equipment. Sometimes you find that we have very small boats and then overload them with big luggage. Ok, you find a boat is made to carry three people that was built by using 25 pieces of wood, for example. You get me, right? The boat has a carrying capacity of three people and a certain weight of fish. Now the fish should not exceed the recommended level, as this line shows; and even if your net is large then cut it to size. But you find that other fishermen exceed the recommended fish weight in the boat. So, the boat loses balance and, if winds blow and the waves become huge, the boat can easily sink.” (IDI\_1, Ruhanga)*

It was also observed that using certain types of wood to construct a boat increases drowning risk, as some woods tend to sink. The wood that sinks is thought to be cheaper than the better-quality wood that floats.

*“Secondly, it’s their fishing boats. The boat owner. The timbers that are used to build the boat. When the boat sinks it goes down directly leaving us floating, because of the timber used to make it.” (FGD\_1, Kasenyi)*

### Lack of life jackets

Many participants across all sites discussed the absence of life jackets in relation to increased drowning risk among fishermen. They said that this prevented fishermen from protecting themselves until they get rescued when drowning accidents occur.

*“They lack life jackets. These jackets are not always available... I mean life jackets are very useful because even if you are at risk of drowning, nowadays there are phones. People will find out some people have drowned somewhere. Even if you don’t know how to swim, the lifejacket will help you and you get rescued. Even if you have already died, your family would see you again; they would take your body and give you a respectable send-off.”* (IDI\_1, Bezi Kisiwani)

*“The cause is the lack of life jackets; we mostly sail in these vessels without life jackets. This also a reason why we drown.”* (IDI\_1, Ghana)

*“Yes, life jackets are very rare here... that’s what often causes drowning accidents.”* (IDI\_1, Ruhanga)

*“Another thing about fishing: we are not safe because we don’t have life jackets, and that puts us at great risk. Yes, we just go without life jackets... I think life jackets are mostly available on islands, as we don’t have them here. The boat owners from around here have a problem; they don’t care about their fishermen.”* (IDI\_1, Kayenze)

However, other respondents reported that fishermen do not always use life jackets even when they are available.

*“The biggest factor which contributes to deaths due to drowning is lack of life saving equipment, for example lifejackets. But I can also say a big proportion of the fishing camps over here have life jackets. But the fishermen use them according to season maybe. The Surface and Marine Transport Regulatory Authority (SUMATRA) have introduced a new rule... they inspect if the camps have lifejackets, and fishermen should wear them. But when the weather condition is good, for example during dry season, there is less wind so many fishermen go into the lake without life jackets.”* (IDI\_1, Kasenyi)

*“The scarcity of life jackets is a problem in the lake. But sometimes a boat owner can buy life jackets for his boat, but the fishermen can be a problem because they may look at them as a decoration in the boat. They do not use them. The same as for motorcycle drivers; they might have a helmet, but they do not wear it, yet it is for their own good to protect their life. It is the same behaviour towards helmet use and the life jacket.”* (FGD\_1, Chifule Ukara)

*“Lack of life jackets and the understanding of how to use life jackets. They have no such knowledge. And they are also ignorant of the importance of a life jacket.”* (IDI\_1, Bezi Kiiwani)

The price and access of life jackets was also raised by many participants as a reason they are not commonly used.

*“It’s the lack of life saving equipment... they are rarely bought. But if life jackets are indeed available in the shops around here at affordable prices, everyone should be buying at least one for themselves.”* (FDG\_1, Kasenyi)

*“Life jackets are available in the shops but they are very expensive, so we boat owners find it very difficult to buy those life jackets for our fishermen.”* (FGD\_1, Chifule Ukara)

### Lack of swimming skills

Lack of swimming skills among the fishermen was frequently reported at all sites. The majority of fishermen, especially from the islands, came from different villages seeking fishing jobs without prior fishing knowledge or swimming skills. These fishermen were considered more likely to die during water accidents.

*“Most of the fishermen here do not know how to swim. I feel that even if they have a life jacket, right? Even if you wear a life jacket you must have some swimming knowledge. Even when you have a lifejacket, you could have another problem if you just lay on the water. Most of the fishermen here cannot swim; [they are] completely unable to swim.”* (FGD\_1, Ruhanga)

*“Our biggest reason [for drowning] among us fishermen is swimming; most of those that come from the village have no idea of how to swim.”* (FGD\_1, Chifule Ukara)

Several participants expressed the need for training in swimming as it is important for their work.

*“If possible there should be an alternative way to teach people how to save their life individually while in water. Everyone has to practice this so that, even if an accident happens, he can save himself or sustain for at least five to 10 minutes. But most of us fishermen; we know how to fish but we do not know how to save our lives. Three quarters of the people who come looking for fishing jobs cannot swim, and it is not a law that you have to know how to swim in order to be employed.”* (FGD\_1, Ghana)

### Alcohol or drug intoxication

The majority of fishermen and other community members acknowledged alcohol and drug use, and its impact on drowning risk among fishermen.

*“The other reason is alcoholism. In most cases when I look at the fishermen, most of them go to the lake drunk. So if it happens that there is a storm they don’t manage to rescue themselves, because if a drunkard falls into water he has no means. He cannot even rescue himself. It is becomes very hard.”* (ID1\_1, Chifule Ukara)

*“The third thing that causes drowning among these fishermen is drunkenness. Drunkenness I mean, you know fishermen, let me just say that it is as if they have given up. So, when he sails to the lake with marijuana, when the accident occurs in the lake it becomes difficult to rescue himself and he ends up drowning. Sometimes they fight among themselves while in the water.”* (ID1\_1, Chakazimbwe)

*“But you know that these young men are normally under the influence of drugs and alcohol, and when they get to the water they assume they are on land.”* (ID1\_1, Base Kisiwani)

Several participants explained the reason fishermen use alcohol/drugs is to give themselves courage to cope with the difficulties of fishing.

*“Yes, drinking is an influencing factor. Alcohol and marijuana. You know the job is difficult. It is certain that you will find some who takes alcohol and weed. It is a belief that alcohol adds courage; that whoever uses alcohol gets more courageous; that even if the stormy weather kicks in, he still remains courageous.”* (ID1\_1, CM743, Ghana)

*“See, you may leave the shore to sail into the water and one of you may have taken some liquor without your knowledge... It is a habit that we develop. We believe that being high on liquor makes the work easier. That is our way of life. But we forget that the water has no friend.”* (FGD\_1, Kayenze)

The ways in which alcohol or drug use contributes to drowning risk among fishermen were discussed. Being argumentative, fighting, sleeping, losing balance, and not being able to swim and rescue oneself were the most

described effects.

*“Yes, the use of alcohol and marijuana can be one of the reasons because [fishermen] are all drunkards. For example, when you consume some alcohol and you face an accident in the water, even if you had a life jacket you would not be able to rescue yourself because you are drunk. And if you fall into the water your head would be heavy; you wouldn’t be able to swim.” (IDI\_1, Chifule Ukara)*

*“So after fishing he drinks, gets drunk and falls asleep. Some fishermen go while drunk; others take alcohol with them and drink while there. So if a storm hits it is easy for them to drown.” (FGD\_1, Ghana)*

### Thematic findings: perceived risk factors among women

The most discussed drowning risk factors among women were (1) travelling in inadequate or overloaded boats, (2) lack of life jackets, (3) lack of swimming skills, and (4) fear.

#### *Travelling in inadequate or overloaded boats*

The majority of participants considered that women are most at risk of drowning during travel in the lake for business activities or seeking medical care. The major reasons described were small boats, overloading of passengers and luggage, and lack of sufficient accessible life jackets, causing problems in bad weather.

*“For example, they don’t participate in fishing activities in the lake, so their deaths are when they are travelling to the other side. On their way, the storm comes and that boat has been overloaded with people and other luggage. In that case an accident might happen.” (IDI\_1, FM, Kasenyi)*

*“The risk of children and women drowning is when they are travelling in a boat. The boat could be overloaded, and then they sail to the lake. Then the weather changes and becomes harsh; so, at that point, they can do nothing at all. When the waves become bigger and stronger, they drown.” (FGD\_1, Ruhanga)*

*“Women have duties (doing business) in the islands. Because of that, once they have their goods in the island and see the boat wants to leave, she has to load her goods for business and leave the island. So those women who drown normally run their business in the islands. They have no option; they are in the lake.” (FGD\_1, Ruhanga)*

Lack of sufficient health care services (such as safe delivery) in some islands was also described by several participants as a reason forcing women to travel across the lake (i.e. to get better health care elsewhere).

*“One of the reasons that women are at risk is that three quarters of women here seek medication elsewhere and use boats to cross the lake. But you may find the boat is overloaded. While it is clear that the vessel should carry only about 40 passengers, they overload three times over.” (IDI\_1, Ghana Island)*

#### *Lack of life jackets*

As for fishermen, lack of life jackets among women was also mentioned as a risk factor for drowning by many participants. Respondents considered that use of life jackets was important during travelling in the lake. However, there were reports that boats often don’t have enough life jackets, or they are locked away so inaccessible.

*“And these transport vessels do not have life jackets, not even these boats.” (IDI\_1, Ghana)*

#### *Lack of swimming skills*

Almost all the participants across all sites mentioned that the majority of women cannot swim, even though they live and work in islands. This is thought to increase their drowning risk.

*"I will speak on the issue of women. Most of those who have come to work here are women, but they cannot swim." (FGD\_1, Kasenyi)*

*"It is very difficult to save themselves because they have no idea of swimming." (IDI\_1, Ghana)*

## Fear

The majority of participants, including women themselves, reported that fear and worry increased their risk of drowning when an accident occurs.

*"Fear also causes one to drown. I personally feel like dying when sailing home." (FGD\_1, Kasenyi)*

*"Women are cowards. You can travel with a woman in a boat and experience a problem that could be solved, but because of the noise they make you might fail to rescue them, and they drown." (IDI\_1, Chifule Ukara)*

## 5.5 Discussion

In this chapter (under study objective 2b), we sought to identify common risk-taking behaviours among fishermen and other community members residing in fishing communities on the shores of Lake Victoria that might put these populations at increased risk of drowning.

Numerous behaviours potentially associated with a higher risk of drowning were reported among fishermen. Most fishermen participating in the survey reported fishing at night and from a boat (made from wood in all cases). From observations of boats departing for, and returning from, fishing, it appeared that most boats out at night did not have lanterns or other lights onboard. According to surveys, while almost two thirds of boats used are powered by engines, almost a third are powered only by oars. Use of oars potentially puts fishermen at higher risk of drowning than use of an engine due to less control and power in difficult situations. However, oars are also more likely to be used in smaller boats, and a small boat size is likely to increase drowning risk. Indeed, in Chapter 4 we found that most drowning incidents involved small fishing boats powered by oars.

Overcrowding and overloading of boats was not commonly reported by survey participants, but 30% of fishermen reported use of boats that were not adequately maintained. All these data are reasonably consistent with the researcher observations of boats, although the proportion of inadequately maintained boats was slightly higher in the researcher observations than reported by participants. Interestingly, use of small and/or poorly maintained boats was also a key theme discussed by the majority of interview and focus group participants as a risk factor for drowning, possibly suggesting that this was 'under-played' as a problem among survey participants.

Most fishermen participating in the survey reported that they do not go fishing in bad weather, but most also do not return to shore if weather turns bad while fishing. The majority of deaths identified in Chapter 3 occurred during bad weather and water conditions, and bad or unpredictable weather was described by participants as a key risk factor for drowning in interviews and FGDs (although often linked with the size and quality of the boat). This is very consistent with findings on drowning deaths occurring on the Ugandan side of the lake, many of which occurred due to stormy weather<sup>3</sup>. A lack of weather forecast was acknowledged by some participants in the current study as a problem in their communities and, indeed, the survey data showed that most fishermen learnt about and predicted the weather only by watching the sky.

Approximately 10% of fishermen reported owning a life jacket and wearing a lifejacket last time they went fishing. However, our own observations of fishermen departing from, and returning to, boat landing sites suggest that usage is actually even lower than this. Lifejacket usage among these Tanzanian communities appears considerably lower than the Ugandan communities described in the recent study by Kobusingye *et al*<sup>3</sup>. This may be due to previous initiatives within Uganda to redesign lifejackets and encourage lifejacket usage<sup>2</sup>. However, like us, Kobusingye *et al* found that usage reported by participants was higher than usage observed by researchers (67 versus 26%, respectively)<sup>3</sup>.

In interviews and FGDs, reasons for not wearing lifejackets were contradictory. It seemed broadly acknowledged that boat owners have a responsibility for purchasing life jackets and providing them to fishermen. In some cases, it was reported that boat owners do not fulfil this responsibility. In others, it was reported that they provide lifejackets, but fishermen do not use them due to perceived poor quality and/or discomfort. There were common reports of fishermen using lifejackets to sleep on when out in boats at night. Some respondents said that lifejackets are not widely available in their communities. However, others said that they are available, but people choose not to buy them, often because they are too expensive and unaffordable. There were also mixed feelings regarding the effectiveness of life jackets. While many people considered them to be useful and important, in some cases this was only to aid in recovery of the body should a person drown. Similarly, Kobusingye *et al* reported frequent references to the poor quality of available life jackets among focus group participants<sup>3</sup>.

While most fishermen in the survey reported that they have never drunk alcohol while fishing, alcohol and drug intoxication were described as risk factors for drowning among fishermen in interviews and FGDs. Respondents reported that fishermen go to the lake drunk (or under the influence of drugs) and are therefore unable to rescue themselves in the case of a storm or other incident. They said that fishing is considered hard work, and that drugs and alcohol make the work easier and the fisherman more courageous. However, IDI and FGD respondents were not completely clear on how common this behaviour is. Interestingly, the proportion of survey participants reporting that a co-worker drank alcohol or took drugs last time they went fishing was considerably higher than the proportion who said they drank alcohol or took drugs themselves. This is perhaps indicative of responder bias among survey participants, whereby self-reported alcohol and drug use are under-reported.

In the survey data, the majority of fishermen reported being able to swim. While, lack of swimming skills was identified as a risk factor contributing to drowning in the fishing communities in interviews and FGDs, responses were mixed. Often, respondents reported that 'outsiders' coming to the communities lacked swimming skills, but people who were born in the fishing communities were able to swim. Interestingly, the ability to swim was far more commonly reported among respondents in the current study than in the Ugandan study<sup>3</sup>. However, this perhaps reflects a difference in the study populations, with the Ugandan study recruiting a wider variety of demographics compared to the current study, which focused only on fishing communities who live and work on the lake. Furthermore, perceptions of swimming ability can be highly subjective; while a person might be able to swim 20 metres from a boat to the shore, he may not be able to swim longer distances or for greater time periods.

While chapter 3 clearly indicates that fishermen are the most at-risk population among these fishing communities, our surveys under objective 2b demonstrate that other community members frequently use the lake for numerous purposes, including work, travel, washing and collecting water. The frequency and extent of exposure to the lake highlight this group as another at-risk group. Interestingly, although over 70% of the other adult community members who drowned in the past two years were male, interview and focus group respondents considered women to be at higher risk, and none considered (non-fishermen) men to be at risk of drowning. This is likely tied to gender perceptions and the culture of male superiority in these communities. In IDIs and FGDs, respondents felt that women were at greatest risk when travelling in the lake (compared to during other activities).

We identified a number of risky behaviours among community members using the lake from participant surveys. For example, less than 10% reported wearing a lifejacket last time they went in or near the water, and interview and focus group participants described lack of life jackets (particularly during travelling in the lake) as a major risk factor associated with drowning. Quarter of survey respondents reported going in or near the water at night, and over half in bad weather. In interviews and FGDs, bad weather during travelling was considered to put community members at risk of drowning.

Approximately 10% of the drowning victims identified in Chapter 3 were children. Under objective 2b, we found that almost two thirds of children in these fishing communities go in or near the lake at least once per week, with the majority going four or more times per week. Reasons included to perform chores such as washing themselves/other items and collecting water, as well as travelling and swimming/playing.

Unsurprisingly, the majority of community member survey respondents reported that there are no barriers in their communities preventing children going in or near the lake. However, in the very few cases where barriers were reported,

these were not physical barriers, but restrictions imposed by parents or even security guards. Despite this, one of the most notable risky behaviours associated with drowning identified among children was a lack of adult supervision when in or near water.

In the Ugandan study by Kobisungye *et al*, almost a third of people disembarking boats were not aware of any measures to take in an emergency on the lake<sup>3</sup>. Furthermore, in chapter 4 we found that, in most drowning incidents, no one called for help and the victim was not taken to a nearby health facility. To gauge awareness among fishing communities on actions to take in the event of a drowning incident, we asked survey participants to answer a few questions on drowning first response. When asked what is the first thing that they would do if they saw someone in trouble in the water, few knew that they should throw an object that floats to the victim. Many fishermen said they would jump in the water, an action that would put the rescuer at risk of drowning. Few respondents knew that someone who nearly drowned, but who is now conscious and breathing, should go to hospital. These data demonstrate a clear lack of knowledge in these communities on actions to take in the case of a drowning incident.

A potential limitation of the survey data is responder bias, e.g. the scope for participants to skew answers according to what they feel they should say rather than what is most accurate. Furthermore, some participants may have been anxious about answering some questions honestly in case community seniors or government officials found out. However, we took measures to ensure that all data were recorded by participant ID rather than personal identifiers, and that all data were confidential. Participants were informed of these procedures before participating in the study. In addition, the interviews and focus groups provided an opportunity for participants to express their opinions about risk taking behaviours and risk factors in their communities more generally without implicating themselves. Indeed, in some cases, the interview and focus group data provided a level of information that was not achieved from participant surveys. The boat observations were another way of overcoming the potential limitations described. However, while these were interesting for observing factors such as life jacket usage, they also had limitations in the types of risky behaviours that could be observed. For example, it was mostly not possible for researchers to observe whether fishermen were drunk or drinking alcohol.

Despite these limitations, our participant surveys have generated a large and unique dataset, containing detailed information on risky behaviours among fishermen and general community members from fishing villages. Furthermore, the survey data are supplemented and complemented by findings from interviews, FGDs and researcher observations of fishing boats. Learning about these communities in this way is an essential first step to identifying and understanding potential targets for drowning prevention interventions.

## CHAPTER 6: EFFECTS OF PERCEIVED RISK OF DROWNING ON OTHER HEALTH-RELATED RISK-TAKING BEHAVIOURS

### 6.1 Overview

In previous studies we have conducted in fishing communities around Lake Victoria, fishermen anecdotally reported to consider their risk of drowning to be high. Furthermore, the perceived risk of drowning among this population appeared to result in a fatalistic attitude towards other health risks. For example, a fisherman might ask why he would worry about catching HIV when he could go out fishing that night and drown; he could still live a long and normal life on treatment (i.e. with anti-retroviral treatment (ART)). A similar phenomenon was reported among fishermen in Uganda<sup>13</sup>.

There are numerous other health threats in these communities. The areas surrounding Lake Victoria are malaria-endemic<sup>14</sup>; and the Lake itself carries high risk of schistosomiasis<sup>15, 16</sup>. Furthermore, the communities are typically densely populated and have poor sanitation and limited healthcare facilities; all factors contributing to poor health outcomes.

Under objective 3 of the current study, we aimed to identify the key health concerns of fishermen and other members of these lakeside fishing communities. Furthermore, we aimed to assess whether their perceived level of risk of drowning affected their attitude toward other health risks. We particularly focused on sexual health risks, including HIV.

To meet this objective, fishermen and other community members, recruited from general community meetings, were requested to complete a questionnaire in which they were asked to firstly rank their priorities in terms of their own and their family's health, religion and income. We then asked questions about participant's own health and risk-taking behaviours (the latter in relation to sexual health). Finally, in the questionnaire, we asked participants to rank pre-specified health threats (including HIV, malaria, schistosomiasis and drowning) by (1) their perceived risk (i.e. how likely they think the health threat is going to affect them), and (2) their level of fear (i.e. how scared they are of the health threat). For example, a person might consider schistosomiasis to be their greatest risk as they are frequently in contact with lake water. However, they might be more scared of being attacked by a hippopotamus or crocodile.

The survey population for this objective was the same as for objectives 2b and 5 (described in Chapters 5 and 8).

We also conducted FGDs and IDIs with fishermen and other community members in each of the study sites. Within these forums, we asked participants to (1) describe any worries regarding their own health and safety, and their family's health and safety, (2) consider what dangers there are to fishermen and other people in their community, (3) consider if there are any factors that put fishermen at higher risk of sexual health threats than other community members, and (4) discuss whether drowning or HIV/AIDS is of greatest concern and why.

### 6.2 Health and safety perceptions and fears from surveys

Three-hundred fishermen and 301 other community members took part in the survey about health and safety perceptions and fears. The population was the same as the survey population for Objective 2b. Population demographics are shown in Table 5.1 (in Chapter 5).

Table 6.1 shows participant's perceived health status and risky sexual behaviours. Most fishermen and community members considered their own health status to be moderate. Approximately a third considered themselves to have excellent health, and less than five per cent considered themselves to have poor health.

Among married fishermen, almost 30% had sex with two or more people in the last three months (maximum number of sexual partners was 20) and, of those, a third did not use a condom last time they had sex (although they were not asked who they last had sex with). Among married community members, 13% had sex with two or more people in the past three months (again, maximum number of sexual partners was 20) and, of those, almost half did not use a condom last time they had sex. Among both fishermen and other community members who were not married, the average

number of sexual partners in the past three months was one. Approximately 30% had sex with more than one person (maximum 15 for fishermen, six for other community members). Almost half of all non-married fishermen and community members did not use a condom last time they had sex. Approximately two thirds of fishermen, but less than quarter of other community members, have previously paid for sex. Almost 20% of community members, but only five per cent of fishermen, have been paid for sex.

Over 50% of both fishermen and other community members reported having concerns over drowning some of the time (Table 6.2). A third of fishermen, and a quarter of other community members, reported worrying about the risk often. Fifteen per cent of fishermen and a quarter of other community members said that they did not worry about drowning.

Table 6.1: Perceived health status and risky sexual behaviour.

VARIABLE	FISHERMEN (N = 300)	COMMUNITY MEMBERS (N = 301)	TOTAL (N = 601)
<b>Perceived status of own health</b>			
Excellent	117 (39%)	96 (32%)	213 (35%)
Moderate	171 (57%)	194 (64%)	365 (61%)
Poor	12 (4%)	11 (4%)	23 (4%)
<b>Number of sexual partners in past three months</b>			
0	30 (10%)	41 (13%)	71 (12%)
1	184 (61%)	207 (69%)	391 (65%)
2 to 5	77 (26%)	50 (17%)	127 (21%)
6 to 10	5 (2%)	2 (1%)	7 (1%)
11-20	4 (1%)	1 (0%)	5 (1%)
<b>Condom use</b>			
Yes, always	78 (26%)	60 (20%)	138 (23%)
Yes, sometimes	136 (45%)	136 (45%)	272 (45%)
No	86 (29%)	105 (35%)	191 (32%)
<b>Used condom last time had sexual intercourse</b>			
Yes	107 (36%)	91 (30%)	198 (33%)
No	193 (64%)	210 (70%)	403 (67%)
<b>Ever paid for sex</b>			
Yes	190 (63%)	67 (22%)	257 (43%)
No	110 (37%)	234 (78%)	344 (57%)
<b>Ever been paid for sex</b>			
Yes	15 (5%)	51 (17%)	66 (11%)
No	285 (95%)	250 (83%)	535 (89%)

Table 6.2: Concerns over drowning.

VARIABLE	FISHERMEN (N = 300)	COMMUNITY MEMBERS (N = 301)	TOTAL (N = 601)
<b>Worry about drowning</b>			
Yes, often	98 (33%)	70 (23%)	168 (28%)
Yes, sometimes	157 (52%)	162 (54%)	319 (53%)
No	45 (15%)	69 (23%)	114 (19%)

We asked all participants to select from a list of pre-specified health threats the three that they considered most likely to affect/happen to them. We then asked them to select the three threats that scared them the most. In each case, we asked participants to rank the three health threats by priority. Table 6.3 shows the number (and percentage) of respondents 'voting' for each pre-specified health threat that they consider most likely to affect/happen to them under ranks one, two and three. Table 6.4 shows the same for participant's health fears. In Table 6.5, we have created an

overall ranking of participant's perceived health risks and fears taking into account the number of people 'voting' for each threat and the weighting given.

Table 6.3: Top three health threats fishermen and other community members consider most likely to affect them.

	FISHERMEN			OTHER COMMUNITY MEMBERS		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
<b>Drowning</b>	138 (46%)	38 (13%)	25 (7%)	82 (27%)	39 (13%)	25 (8%)
<b>Car/motorcycle accident</b>	14 (5%)	23 (8%)	36 (12%)	10 (3%)	36 (12%)	33 (11%)
<b>Animal attack/bite</b>	1 (0%)	9 (3%)	8 (3%)	2 (1%)	5 (2%)	9 (3%)
<b>Heart disease</b>	6 (2%)	9 (3%)	20 (7%)	13 (4%)	17 (6%)	22 (7%)
<b>Cancer</b>	0 (0%)	4 (1%)	6 (2%)	4 (1%)	8 (3%)	13 (4%)
<b>Hepatitis</b>	1 (0%)	8 (3%)	5 (2%)	2 (1%)	3 (1%)	2 (1%)
<b>Schistosomiasis</b>	45 (15%)	58 (19%)	51 (17%)	39 (14%)	47 (16%)	44 (15%)
<b>Malaria</b>	17 (6%)	34 (11%)	33 (11%)	46 (15%)	43 (14%)	41 (14%)
<b>Typhoid</b>	9 (3%)	24 (8%)	36 (12%)	13 (4%)	26 (9%)	35 (12%)
<b>HIV/AIDS</b>	60 (2%)	67 (22%)	45 (15%)	84 (28%)	47 (16%)	48 (16%)
<b>Syphilis</b>	2 (1%)	7 (2%)	9 (3%)	2 (1%)	16 (5%)	10 (3%)
<b>Other STI(s)</b>	5 (2%)	18 (6%)	29 (10%)	3 (1%)	15 (5%)	19 (6%)

Table 6.4: Top three health threats feared most among fishermen and other community members.

	FISHERMEN			OTHER COMMUNITY MEMBERS		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
<b>Drowning</b>	136 (45%)	49 (16%)	23 (8%)	89 (30%)	29 (10%)	24 (8%)
<b>Car/motorcycle accident</b>	6 (2%)	28 (9%)	34 (11%)	10 (3%)	43 (14%)	23 (8%)
<b>Animal attack/bite</b>	3 (1%)	4 (1%)	8 (3%)	3 (1%)	10 (3%)	12 (4%)
<b>Heart disease</b>	8 (3%)	20 (7%)	31 (10%)	9 (3%)	23 (8%)	30 (10%)
<b>Cancer</b>	2 (1%)	9 (3%)	11 (4%)	10 (3%)	18 (6%)	22 (7%)
<b>Hepatitis</b>	1 (0%)	11 (4%)	19 (6%)	4 (1%)	7 (2%)	16 (5%)
<b>Schistosomiasis</b>	10 (3%)	28 (9%)	39 (13%)	11 (4%)	28 (9%)	28 (9%)
<b>Malaria</b>	11 (4%)	21 (7%)	38 (13%)	18 (6%)	35 (12%)	39 (13%)
<b>Typhoid</b>	3 (1%)	10 (3%)	25 (8%)	4 (1%)	15 (5%)	22 (7%)
<b>HIV/AIDS</b>	113 (38%)	94 (31%)	29 (10%)	137 (46%)	54 (18%)	44 (15%)
<b>Syphilis</b>	1 (0%)	10 (3%)	13 (4%)	1 (0%)	19 (6%)	21 (7%)
<b>Other STI(s)</b>	6 (2%)	16 (5%)	30 (10%)	5 (2%)	19 (6%)	21 (7%)

Table 6.5: Ranking of perceived health risks and fears according to frequency and order of response.

	FISHERMEN		OTHER COMMUNITY MEMBERS	
	Greatest risk	Feared most	Greatest risk	Feared most
<b>Drowning</b>	1	2	2	2
<b>HIV/AIDS</b>	2	1	1	1
<b>Schistosomiasis</b>	3	3	4	5
<b>Malaria</b>	4	4	3	3
<b>Car/motorcycle accident</b>	5	5	5	4
<b>Typhoid</b>	6	8	6	9
<b>Other STI(s)</b>	7	7	8	8
<b>Heart disease</b>	8	6	7	6
<b>Syphilis</b>	10	10	9	10
<b>Animal attack/bite</b>	10	12	11	12
<b>Hepatitis</b>	11	9	12	11
<b>Cancer</b>	12	11	10	7

Fishermen considered that drowning was the health threat most likely to happen to them, followed by HIV infection/AIDS, followed by schistosomiasis. However, HIV infection/AIDS scared fishermen most, followed by drowning and schistosomiasis. Other community members considered that they were most at risk of, and were most scared of, HIV infection/AIDS, followed by drowning, followed by malaria.

### 6.3 Health and safety perceptions from in depth interviews and FGDs with fishermen

#### Brief demographics of respondents

A total of 12 in depth interviews exploring health and safety perceptions among fishermen were conducted across eight fishing communities (Bezi Kisiwani, Chakazimbwe, Chifule Ukara, Ghana, Kasenyi, Kayenze, Kijiweni, Ruhanga). Participants were all male fishermen who had been fishing in their respective areas for an average of 11 years (approximate range: three to 30). Ages ranged from 26 to 52 years (median 38). All had offspring, ranging from one to 10 children, and all but two were married. Five said they spent at least part of the time living separately from their families in order to fish.

Eight FGDs, each including eight to 10 participants, were conducted across the same eight fishing communities. The total number of participants was 73 (65 male; eight female), and ages ranged from 22 to 67 years (median 38). Most (n = 53) were fishermen, but other community members (n = 20) were also included.

IDI and focus group findings were similar and have thus been reported together.

#### Thematic findings: health and safety perceptions

Major deductive and inductive themes were (1) fishermen's greatest fears, (2) major fishing risks, (3) major risks for fishermen and their families on land, (4) risk-taking and (5) risk prevention. Findings under the second theme (major fishing risks) overlapped and were consistent with findings from IDIs and FGDs in Chapter 5. Data for these themes are therefore only presented in brief.

#### *Fishermen's greatest fear*

Almost all fishermen said that drowning was their biggest fear, and a greater risk to their health and safety than HIV and AIDS or other health and security concerns. Fishermen explained that drowning happened quickly and could not be adequately prepared for, while death from AIDS could be prevented through self-control and delayed through ART.

*"I fear drowning because my life is in the water. I have no option. I must sail into the lake; therefore, I must face the risk of drowning daily. But as far as HIV is concerned, it is a matter of choice; you can choose to protect yourself or expose yourself to the infection."* (IDI\_2, Chifule Ukara)

*"If found to be HIV positive, they will begin ART and can live like a healthy person... Nobody fears AIDS nowadays; it has become an ordinary issue. In fact, we even know who among us are on medication. Some sail with their medicines to fish and, using Dasani [bottled] water, they swallow the medication at the required time."* (FGD\_2, Chakazimbwe)

*"The AIDS victim can be on medication and still be alive and continue working until old age, but that is not the case for drowning. Drowning is immediate."* (FGD\_2, Kasenyi)

Several also related this to the people they knew who had drowned versus dying of AIDS.

*"I know at least two people who died of drowning, but I know none who died of AIDS."* (FGD\_2, Kayenze)

However, others noted that drowning was visible and 'honourable,' while HIV infection was likely more prevalent but often kept secret and considered shameful.

*“For instance, the number of people who died of drowning this year is three to four people, but if you test [for HIV], the number of infected people is so many.” (FGD\_2, Ruhanga)*

*“[Drowning] is heroic, unlike AIDS. If I get infected, my children will despise me; I will not be able to face or lead my family. I will be a disgrace.” (IDI\_2, Bezi Kisiwani)*

When discussing whether drowning or HIV had a worse effect on their families, several noted that the stigma connected with AIDS and the possibility of transmission to their wives and children made HIV worse. Additionally, fishermen living with HIV might be less able to work and become a burden on their families.

*“Firstly, it is because of the shame that I will bring to myself and my family within the community. They will say: ‘look at him, he went sleeping around and now he has AIDS’. But with drowning, they will say ‘Hey, our brother drowned. He died like a soldier at war. He died fending for his family’.” (IDI\_2, Kasenyi)*

*“Drowning is an accident. It is bad luck, and people respect you when you die, Unlike AIDS. Nobody respects you when you die. You leave a very bad example behind.” (IDI\_2, Kasenyi)*

*“Before you die [of AIDS], you will have caused your family a lot of pain and trouble because you need to be nursed; you need medication. You will not have energy to work so you will be a dependant. So, in my view, death from AIDS is a bigger problem than death from drowning.” (FGD\_2, Chifule Ukara)*

### Major fishing risks

Most fishermen reported fishing as a very dangerous job, though some indicated that this depended on one’s experience and common sense.

*“I say that this job is not risky. It only becomes risky when we do not follow procedures as required of a fisherman. For example, it becomes risky if we don’t wear life jackets while fishing; when the canoe we use is not strong enough it also becomes risky. We say that fishing is risky when the vessels we use are not in good shape. But if the vessel is in good shape and whoever is in it wears a life jacket, even if the storm comes and the canoe is destroyed, or strong winds sink the vessel, the person remains afloat and can be saved as the lake is surrounded by fishermen, who may spot the sinking vessel and rush to save the person. I therefore submit that our fishing job is not risky to our lives.” (FGD\_2, Chakazimbwe)*

However, most agreed that many fishermen were inexperienced and/or felt unable to refuse working in unsafe conditions. Several indicated that they would prefer to do something else, but saw no other opportunities.

*“Fishing is a dangerous job but, as far as our education is concerned, this is the only job we can do well in order to make ends meet.” (FGD\_2, Bezi Kisiwani)*

Fishermen discussed many different risks, though the most common were weather changes, robberies, weak boats and ineffective equipment, inadequate hygiene, and drunkenness and drugs.

*“You know we sail very far sometimes, and let’s say we encounter storms. Now these storms sink our boats, because our boats are small and are made of sinkable wood, so we are left to swim. Now whether you are a good swimmer or not you will not survive 12 hours in water. OK, let us assume you have a life jacket. Remember, life jackets have a span of time they can be in water; some a few hours to 24 hours. Considering our distance from the shore, it could take the rescue team even three days to find us. By that time the floaters will be spent. People eventually die from drowning. Others even die of hunger. So I submit to you that, sincerely speaking, fishing is a dangerous job.” (FGD\_2, Bezi Kisiwani)*

Being killed by other boats, either due to accidental crashes, or particularly as part of brutal robberies, was a major concern.

*“They approach you with weapons. They rob you of your fish. They then come to your boat and ask you how you want to die; whether you want to throw yourself in the waters, or you want to have your neck chopped off ‘like a t shirt’. Or they ask you if you want your legs chopped off ‘like short pants.’ Those are the terms they use. Now, we contribute a lot to the economy of the district and the entire nation. We should be offered security.”* (FGD\_2, Chifule Ukara)

Poor hygiene was a frequently mentioned concern in both waters and land.

*“[Fishermen] defecate and urinate in the water and then feel thirsty and drink the same water. They then feel hungry and cook with the same water... Is it possible to wash away the bacteria in the waters? Are the waters really safe for consumption? The fishermen never carry any water. They simply sail dry and utilize the lake waters, raw as it is. My personal belief is that those waters are not safe to drink. They are not safe for consumption whatsoever.”* (FGD\_2, Bezi Kisiwani)

*“Because we fishermen lack toilets we sail to the lake on our canoes with no toilets, meaning we have nowhere to take our toilet calls. If you feel the urge to take a long call, you must do it where? In the waters. Now that stool is dangerous for those who use the water. They contract diseases such as schistosomiasis. I really do not see the possibility of constructing a canoe with a toilet. That would be difficult.”* (FGD\_2, Chakazimbwe)

*“Even in hotels, when you go to eat and ask for water, you are given water fetched from the shores. The same water is used to cook...”* (FGD\_2, Chifule Ukara)

Animals, such as crocodiles and hippopotami were not considered a major threat, as they stayed near the shore and fishermen could easily avoid them by sailing to deeper waters.

*“Such animal attacks occur at the shores, but we don’t fish at the shores...”* (FGD\_2, Bezi Kisiwani)

### *Major risks for fishermen and their families on land*

The major risks discussed by fishermen that they and their families experienced in their communities were STIs, inadequate hygiene, and lack of security (e.g. to prevent robberies).

The most frequently discussed risk for fishermen was that of STIs, because fishermen could spend long periods on the water and away from their families, many women in the community provide sex for money, and fishermen, particularly the younger ones, were not careful.

*“Once the fisherman sets foot on the shore all they want is entertainment. They just want to have sex.”* (FGD\_2, Bezi Kisiwani)

*“Another cause of unsafe sex practices is poverty. You find a beautiful woman has no money to sustain her life, then she decides to practice prostitution for money in return.”* (FGD\_2, Kayenze)

Condoms were reported as readily available and affordable, but not popular.

*“I tell you that a shopkeeper can buy a box of condoms and last a year with it without selling it out.”* (FGD\_2, Bezi Kisiwani)

Most reported avoiding condoms due to loss of pleasure, drunkenness, and lack of knowledge. Women noted that men could force them not to use condoms.

*"You have spent his money for so many days; now the day for sex comes and you refuse because he has no condoms. No way; he will force you to just to have sex with him."* (FGD\_2, Bezi Kisiwani)

Some were concerned about condom effectiveness and safety, or perceived danger from condoms.

*"There is a popular belief that condoms are contaminated with some microorganisms. Others believe that the lubricant on the condoms can cause health hazards. That is why most people refuse."* (FGD\_2, Bezi Kisiwani)

The most common risk discussed for fishermen and their families was hygiene-related disease, primarily identified as bilharzia, cholera, typhoid, amoebiasis, and urinary tract infections.

*"You know we forget our responsibilities here. We are not serious about hygiene. When the toilets here are full, we do not have a way of suctioning the human waste out or we cannot find space to sink a new latrine. So all the human waste goes out and flows into the waters. If you look around you will see what I am talking about. Diarrhoea is a perennial problem here."* (FGD\_2, Bezi Kisiwani)

*"We have no toilets, so fishermen defecate and urinate in bushes, and they use their own clothes to clean themselves up. This impurifies water, which leads to the spread of diseases beside the lake."* (FGD\_2, Ruhanga)

Fishermen also discussed other 'normal' diseases (e.g. malaria, pneumonia), though primarily in terms of poverty and concerns for their families' health.

*"We live pathetic lives; lives of poverty and hunger. Sometimes you can leave your home while your family has not eaten. They are hungry, and you come to these shores and sail to the waters to fish but get nothing out of it. So you go back to your home empty-handed, just like you came"* (IDI\_2, Runhanga)

Security was a concern for a number of fishermen, depending on whether they lived in an area with any formal policing.

*"We have no security on land. Just the same way we have no security in the waters. There is not one police station here; and there is no patrol in the water..."* (FGD\_2, Ghana)

### *Risk-taking*

Risk-taking was often initially justified by lack of choice, e.g. lack of knowledge about or access to life-jackets and condoms. However, it was often apparent that fishermen had the information they needed but took risks because it was enjoyable and relieved stress (e.g. drinking, drugs, non-use of condoms) or was expedient and/or they felt they lacked the agency to complain (e.g. non-use of life-jackets, not checking boats, not reporting drunk colleagues). Thus, perspectives on risk-taking were particularly conflicted.

Condoms were described as useful for preventing HIV and other STIs but were not deemed enjoyable or necessary enough to use routinely.

*"The government has provided us with condoms, but we don't use them. This is a choice, but what we fear has no choice and it is in the water..."* (FGD\_2, Bezi Kisiwani)

*"One reason is drunkenness. While drunk, people are careless and overconfident. They simply indulge in unprotected sex without caring. That is how the virus spreads."* (FGD\_2, Bezi Kisiwani)

*"These beautiful girls you see here are very tempting. We find ourselves sleeping with them. When a fisherman has money, he goes to drink alcohol. He then lusts for the girls and approaches one, but of course she is a prostitute. So, they negotiate the price; they arrive at two figures. One figure will be paid for sex without condoms and the other figure will be for protected sex. Now can't the fisherman just reason that this is a bad idea; why should she have two prices?"* (FGD\_2, Chifule Ukara)

Many fishermen described their colleagues as careless or 'uneducated'.

*"They talk about life jackets, but they don't wear them. Secondly, they normally sleep in the water, so they use the life jackets as mattresses."* (FGD\_2, Kasenyi)

*"When someone gets an STI, they don't even go to hospital for medication. They hide and secretly go for traditional herbs, but these herbs do not work and the disease grows in the body"* (FGD\_2, Chifule Ukara)

However, many related risk-taking to poverty.

*"... because of poverty you find a person uses a worn-out canoe to fish, and he fishes without having life jackets, which puts him in danger of drowning when storms come."* (FGD\_2, Ruhanga)

### Lack of support

A number of fishermen noted that they received little support from government and community leaders.

*"There is the issue of infrastructure. We don't even have roads here, none at all. We cannot even build any better housing because we lack the resources and space due to government policies. So we cannot advance this island. We need a more vibrant transport system here. Now, we don't even have secondary schools here; no teacher, no doctors. Imagine that kind of situation"* (FGD\_2, Kasenyi)

*"That is why I blame the leadership; because the leaders promised to build toilets for us, but they have not done that. They do not fulfil their promises at all."* (IDI\_2, Kasenyi)

Many indicated that their lives were not valued by those in power.

*"The safety in our lives is very poor. We have very low security status in this area. Even if you go to the fishing camps, you may expect that all these camps have ensured safe and secure environments for their fishermen to work, by supplying all the equipment necessary to keep the fishermen safe. But no, that is not and has never been the case. Fishermen are left, abandoned to sail without any safety measures in place. If they encounter storms they have no way to rescue themselves. There are no life jackets, or the boats are too weak; they break into pieces if we encounter bad weather. Then we have no security on land. We are exposed to gang attacks and robberies. If you visit these camps you won't find even one security guard, and this encourages thieves. So you can see that we are not safe and secure both in the waters, while fishing, or on the land here where we stay."* (IDI\_2, Ghana)

*"With this job [fishing], people have nicknamed us all sorts of names that indicate that they are looking down at us. it is like our lives are meaningless. There are people who say so about us. So if I was to be a teacher or do some other decent business, I would have changed."* (IDI\_2, Kijiweni)

Most fishermen expressed fears that if they spoke up or were seen to make trouble, they would no longer be able to work. They blamed the boat owners for exploiting them and government officials for cheating and/or not supporting them.

*"If we speak we lose our jobs"* (FGD\_2, Chakazimbwe)

*"Honestly, the owners from years I am not sure of, colonial times, those that used to take Tanzanians that tie ropes... that is the same way they treat their fishermen, meaning they only care about the luggage that the canoe delivers... The main exploiter is the owner of the canoe."* (FGD\_2, Chakazimbwe)

*"We have got a fisheries officer who should provide us with the education of what we need to sail with to keep us safe; that we need life-jackets. No, we don't even know how to dress in those life-jackets, even if we had them."*

*We need education to strengthen our knowledge of such matters, but these officials only come here to loot from us and then they leave..." (FGD\_2, Chifule Ukara)*

Most indicated that, given the beneficial economic impact of fishing, government should take a much stronger lead in ensuring the health and safety of fishermen and their communities and in enforcing existing laws.

*"Fishing is a good job that earns revenue for the government... We need better government presence here... We need government inspectors here; those who ensure that boats are all in good shape with the strongest wood possible; that boats can sail through a storm without being broken. Their quality and age should be checked. We also need a government patrol boat; one that will be used to patrol the waters. These patrols can save lives. A patrol boat could come to the rescue of people who have been hit by a storm." (FGD\_2, Chifule Ukara)*

*"I second the opinion that fishing is not a dangerous job. However, it may seem dangerous because the activities involved are under-developed. They need to be improved so that fishing can be a safer job. Further if the equipment we use can be improved too, then fishing will be as safe as any other job. Nobody will view fishing as dangerous anymore." (FGD\_2, Ghana)*

## 6.4 Discussion

In Chapter 6, under objective 3 of this study, we have explored common beliefs and conceptions regarding health risks and threats affecting Tanzanian fishing communities surrounding Lake Victoria. Among these communities, the most common perceived health threats included sexually transmitted infections (most notably HIV), malaria, and other diseases associated with poor hygiene and the lake (such as schistosomiasis). Interestingly, non-communicable diseases were not generally considered to be big health risks.

From surveys among fishermen, the perceived risk of drowning appears to be comparable to HIV/AIDS. Among other community members, perceived risk of drowning is second to HIV/AIDS, but higher than other health threats. From interviews and FGDs, however, feelings towards HIV/AIDS versus drowning were mixed and complex.

Some people reported that drowning is the bigger and more feared risk because a person does not have any control over it. He/she must use the lake and must go out in the lake to work; there is no choice involved. HIV, on the other hand, is considered to be a matter of choice; someone can make decisions regarding his/her sexual behaviour and choose to protect themselves. Furthermore, people reported that HIV is common and an 'ordinary issue'. They said it is possible to live a normal and healthy life on HIV treatment, and to work until old age. Drowning, however, is immediate. Similarly, Asiki *et al* previously reported anecdotal evidence that fishermen 'discount the threat of HIV as a possibly lethal infection because they face the more immediate daily threat of drowning'<sup>17</sup>.

Yet, other people in the current study felt that HIV/AIDS is more feared because of societal perceptions and judgement. They reported that drowning is bad luck, but heroic and honourable. They said that a person who drowns while fishing, for example, dies providing for their family and will be respected. Dying from AIDS, however, was considered shameful. Respondents said that a person who is sexually promiscuous and catches HIV will bring shame on their family and will not be respected.

Interview and focus group respondents also discussed risk-taking behaviours with regards to some of the most commonly cited and feared health threats. Interestingly, although fishermen and other community members were aware of behaviours that put themselves at risk of certain health threats, and although they reported fearing those health threats, they still reported partaking in the risk-taking behaviours. For example, respondents were aware that condoms help to prevent HIV infection but acknowledged that they are not commonly used because they are not deemed enjoyable, or because of pressure from a sexual partner. Similarly, fisherman respondents reported knowing that fishing in bad weather is a risk factor for drowning, but also reported failing to return to shore if bad weather arrived while out fishing. It appears that the fishermen perceive their risk of these health threats to be high, and they are aware of how to reduce their risk. However, for various interrelated reasons, they do not consider it worth the effort, cost or sacrifice to implement these risk-reduction strategies.

On the other hand, respondents felt that they are at increased risk of diseases resulting from unsanitary conditions in the lake, for example because they defecate and urinate in the lake and then drink the same water, but that they do not have any choice in this, or any other option available.

Originally, we considered that comparison of sexual risk-taking behaviours between fishermen and other community members would assist in evaluation of the hypothesis that fishermen's perceived risk of drowning *altered* their sexual risk-taking behaviours because of their fatalistic perspective, as eluded to by Asiki *et al*<sup>17</sup>. This approach was based on the assumption that fishermen's perceived risk of drowning was higher than that of other community members. However, in the current study it became apparent that other community members in these in these fishing communities also see their risk of drowning as very high (an interesting finding in itself). Thus, while we can confidently draw conclusions from this study that drowning is considered a significant health threat, and that sexual risk-taking behaviours are common, it is difficult to confirm any association between the two.

There are a couple of potential limitations to the data collected under this objective. Most notably, we recruited study participants through large community mobilisation meetings. People attending the meetings were invited to participate. Thus, participants were in part self-selected. This may have resulted in selection bias in the health threat data as people may have been more likely to participate if they already had some interest in, or concern over, drowning. Another approach to the study design would have been a household survey. However, this would have been less practical and ineffective for other objectives (in which it was important to target people who used the lake and had some knowledge about drowning). In addition, participants knew that the study was about drowning and potentially saw the study as a way of getting money and resources into the community to improve fishing. Indeed, many requests were made by study participants for life jackets, drowning awareness training etc. It is therefore likely that some participants put more weight on drowning as a perceived health risk than they would in alternative settings or studies. However, qualitative responses helped balance this as more complex data and responses were obtained. Also, anecdotal evidence from previous studies on HIV and other STIs in similar communities also suggested that drowning is considered a common and feared health threat.

## CHAPTER 7: SOCIAL AND ECONOMIC IMPACTS OF DEATH DUE TO DROWNING

### 7.1 Overview

Worldwide, drowning most effects young age groups, with children aged one to four years most at risk<sup>1</sup>. However, fishermen whose lives are spent living and working on large water bodies such as Lake Victoria are likely a large but neglected at-risk group. Deaths due to drowning among the latter populations probably have vastly different social and economic consequences compared to the former.

Fishermen on Lake Victoria are typically males of working age. In the East African culture, these men are likely to be the bread-winners of families, providing money for food, accommodation, children's education and much more. Furthermore, family sizes can be large, with adults having many dependents. Indeed, in Uganda, it was estimated that each fisherman who drowns leaves behind, on average, eight dependents<sup>2</sup>. Thus, the impact of a single drowning death of a fisherman is likely to be substantial, possibly including loss of income, inability to educate children, and loss of social status within a community. Furthermore, consequences of deaths due to drowning among fishermen are likely to extend further than the family, with colleagues and other community members also affected, for example due to loss of earnings of a business.

To evaluate the social and economic impact of deaths due to drowning among fishermen, and also other members of a fishing community, we conducted in depth interviews with family members and colleagues of drowning victims. Specifically, we interviewed family members and colleagues of drowning victims identified and reviewed in objectives 1 and 2a (described in Chapters 3 and 4). In the interviews, we asked participants (1) how the death affected the victim's family, (2) whether the family had to make any changes after the death, (3) how the death affected the victim's business, and (4) what has happened to the business since he/she died. We also asked each participant how the death has affected them personally.

### 7.2 Social and economic impacts from IDIs

#### Brief demographics of respondents

Twenty-two in depth interviews were conducted with family members and colleagues of drowning victims who had died in the past two years. The interviews were conducted across eight fishing communities (Bezi Kisiwani, Chakazimbwe, Chifule Ukara, Ghana, Kasenyi, Kayenze, Kijiweni, Ruhanga). Participants (13 male; nine female) included nine fishermen and 13 other community members. Ages ranged from 24 to 58 years (median 35).

#### Thematic findings: impacts among family members

Family members of drowning victims (including spouses, children, parents and other family members) were interviewed to explore social and economic impacts of drowning death. The major discussed social and economic impacts were (1) loss of income and support, (2) finding other sources of income and moving away, (3) family breakdown, and (4) increased burden to care for family.

#### *Loss of income and support*

Drowning incidents resulted in considerable economic impact on the family of the deceased.

*"My husband's death really stalled my growth. In fact, I was losing it because of the kind of life I was living a few months after his death. I was thrown out of the house that we were renting so I had to look for a more affordable one to rent. Okay, then let us come to the children. They cannot survive without me. They simply cannot do without me because I cater for their food, education and clothing. It has been an unending struggle with these children."* (IDI\_3, Kasenyi)

*“So the family depended a lot on him, despite him not having his own children: the whole family plus his mother and father. So, in one way or the other, his family is kind of... because he was the breadwinner of the family. He used to defend his family economically, you see because he was a very important person in the family So, when a family loses such a good soldier, it becomes much affected.” (IDI\_3, Chifule Ukara)*

#### *Finding other source of income and moving away*

Several participants, especially the wives of the deceased, reported they had to engage in other economic activities like farming or starting a small business in order to support their families. Some families had to move away.

*“When he died, I invested in some small hotel business.” (IDI\_3, Kasenyi)*

*“They don’t live there anymore; the place turned into a farm now. She went to the mainland; her relatives took her.” (IDI\_3, Ghana)*

*“After the death, his wife continued to live here for sometimes and do some work; but after some time, she left to her home in Nansio Ukerewe. But I did not know exactly where she headed, though she is still alive.” (IDI\_3, Ghana)*

#### *Family breakdown*

Many participants reported they had experienced weak family ties after the death. The family separations were mostly associated with lack of economic support

*“He had lot of responsibilities in the family because his father died, his young brother died. He was left with the family of the young brother to take care of, and he took care of his family. After he passed away the family separated, they closed the house and they shifted to another place. Many people are struggling to survive; they are affected with life, so taking those children is like adding more problems. So their grandmother took them after crying for them. She gets help from people who willingly want to. She is given clothes, but the house is closed and they sold it already.” (IDI\_3, Ghana)*

Several participants who lost their children due to drowning experienced bad relationships with their husband and other relatives as they were blamed for the death. A mother of a child who drowned said (of her husband):

*“Alright, ever since all that happened, we are not even in communication. We do not communicate for whatever reasons; even when we come across each other while walking we don’t talk.” (IDI\_3, Chifule Ukara)*

#### *Increased burden to care for family*

A brother-in law of a deceased fisherman said:

*“To be honest life is very hard there because he was the light for them; a sole provider. So I became the provider of two families because they said I am the one who caused his death because of letting him go fishing. His wife has nothing; she was just waiting for him to provide and the children are very small. The life is very hard there.” (IDI\_3, Ghana)*

#### *Thematic findings: impacts among colleagues*

Previous colleagues of drowning victims were interviewed to explore social and economic impacts arising from the death. The most discussed social and economic impacts were (1) loss of man-power/reduced production, (2) business closure, (3) increased burden to care for the family, and (4) psychological impacts.

### *Loss of man-power/reduced production*

*"I struggled too much to have a faithful partner like him. I struggled much in work because you can work with someone who has no vision, but with him we were having some focus to buy some things, and some of our plans were already fulfilled. In three months I was not able to get a faithful man like him that I can leave my boat with; no one was working like him. As you know in work, if you are three and one of you is lazy, he can learn from the two why I am not like them."* (IDI\_3, Ghana)

### *Business closure*

Several participants reported the boats used by drowning victims were normally sold due to superstitious beliefs, thus resulting in fishermen losing their jobs.

*"So after he died the canoe was taken back to its owner, yes, because once a canoe causes a death people are normally afraid of it. So the owner may be forced to sell it. He may find people who do not know the history of the canoe; he may sell it to people very far from the place where it caused a death. I have not seen it working here up to now."*

*"Yes, I mean they are fearful; they fear that the boat will lead them to the same fate that the deceased met. Some even believe that, if they sail in that canoe, the dead will haunt them in their sleep, or they will have nightmares about the deceased; so they fear such things."* (IDI\_3, Kasenyi)

### *Increased burden to care for the family*

Some colleagues of the drowning victim were forced to take care of his family and their daily needs.

*"I was helping my in-law when she was here. I gave her some money when I had it."* (IDI\_3, Ghana)

### *Psychological impacts*

Some colleagues of deceased fishermen reported psychological effects.

*"Not seeing him is already psychological torture personally; I become afraid every day. Yes, you become worried every time you remember how he died."* (IDI\_3, Bezi Kisiwani).

## 7.3 Discussion

In this Chapter, and under objective 4 of the study, we have demonstrated that social and economic effects of drowning can be considerable and varied. Impacts described by family members included loss of family income, pressure to find other income sources, requirement to move out of the family home or community, increased burden on other family members in caring for children and even family breakdown. Many respondents said life became very hard after the death. In cases where the deceased was a fisherman, family members frequently reported that he was the main breadwinner for the family. In cases where the deceased was a child, mothers reported being blamed for the death due to inadequate supervision.

Among colleagues of drowning victims, frequently reported impacts of the death included loss of man power, loss of income, difficulties in replacing their deceased colleague and pressure to provide money and other support to the family of the deceased. Interestingly it was reported that, when someone on a boat drowns, people in these fishing communities fear using that boat. They believe that it will bring them the same fate, or that they will be haunted by the person who drowned. Because of these beliefs, boat owners will typically sell boats involved in drowning incidents, resulting in loss of income for themselves, and loss of jobs for the fishermen who were hired by them. Many people reported psychological effects following the drowning incident, as well as increased fear of water.

It was previously reported that each Ugandan fisherman who dies leaves behind, on average, eight dependents<sup>2</sup>. However, though the original source of this statistic is not known. Data from Chapter 4 (objective 2a) suggest that the deceased Tanzanian fishermen (and other adult drowning victims) from communities in the current study typically had fewer dependents. However, over half were married and had at least one dependent, and almost 20% had at least four dependents.

To our knowledge, no previous studies have examined the social and economic impacts of drowning deaths on colleagues, and in the current study these impacts appear to be significant.

Our data on the social and economic impacts of drowning represent only a preliminary, qualitative assessment, derived from interviews with select family members and colleagues of the drowning victims identified in Chapter 3. In many cases, close family members and colleagues were no longer living in the community, and we did not have the capacity to track them down. This may have resulted in bias within the data, as it is conceivable that those with worse outcomes were required to move away.

We did not seek to perform any further detailed economic analyses incorporating income and other data, though this would be the next step to generate further evidence. For example, a recent study performed by Frontier Economics, sponsored by the RNLI, sought to quantify the economic cost of drowning for all countries by determining a hypothetical monetary cost to society of a life lost<sup>18</sup>. They included human capital data, i.e. the economic output generated in an average lifetime, as well as data on the amount of money people would be willing to spend to reduce their risk of drowning. By combining data on drowning burden and cost to society, it is possible to generate quantifiable data to inform and guide national policy makers on spending decisions with regards to drowning prevention. In the study by Frontiers Economics, the cost of drowning was further expressed as a percentage of gross national income. Data generated unsurprisingly indicated a disproportionately high cost of drowning in many low-income countries.

## CHAPTER 8: PERCEIVED FEASIBILITY AND ACCEPTABILITY OF POTENTIAL DROWNING PREVENTION INTERVENTION STRATEGIES

### 8.1 Overview

Previously, a number of initiatives have aimed to reduce the risk of drowning in Ugandan fishing communities. These included re-designing lifejackets<sup>2</sup>, delivering early severe weather warnings to smart phones<sup>8</sup>, and introducing a search and rescue operation<sup>6</sup>. However, subsequent research in Uganda demonstrated only minimal effect of these interventions. Only quarter of fishermen were found to wear life jackets<sup>3</sup>, very few fishermen had smart phones that could receive the weather warnings sent<sup>8</sup>, and three-quarters did not know how to call a rescue service in case of an emergency<sup>3</sup>.

In the current study we aimed to gather evidence to *inform* development of potential interventions to prevent drowning among fishermen and the wider communities. Under objective 5, we specifically aimed to evaluate acceptability and perceived feasibility of potential interventions. To meet this objective, we first asked fishermen and other community members to complete a researcher-assisted questionnaire including questions on (1) whether they consider there to be adequate drowning prevention measures in their community, (2) whether they think that further interventions are required and (3) which interventions they would support. We also asked them to rank pre-specified interventions (such as improved life jackets and child-proof barriers around large water bodies) according to (1) how effective they think they would be within their community and (2) how feasible they think they would be. The survey population for this objective was the same as for objectives 2b and 3 (described in Chapters 5 and 6).

In addition to data collection by questionnaire, we also conducted FGDs in each of the six study sites. These discussions included fishermen and other community members (some of whom also worked in the fishing industry, and others who did not). In the FGDs, we asked participants to (1) describe measures currently in place to prevent drowning in their community, and consider how effective these measures are, (2) discuss factors that prevent fishermen from wearing life jackets in their community and (3) consider what measures could be taken to reduce the risk of drowning among fishermen and other community members (including children).

### 8.2 Perceived acceptability and feasibility of potential interventions from participant surveys

Three-hundred fishermen and 301 other community members took part in the survey about potential drowning interventions. The population was the same as the survey population for Objectives 2b and 3. The demographics are shown in Table 5.1 (in Chapter 5).

Table 8.1 shows responses from fishermen and other community members on their perceptions of potential interventions and their willingness to engage in them. Most participants considered that there were not adequate measures currently in their community to prevent drowning and almost all felt that further interventions were required. The majority of respondents said that there should be stricter laws on boat maintenance, and that they would attend training on boat maintenance if offered cheaply or free of charge. Over 90% of respondents said they would be more likely to wear life jackets if they were more widely available, cheaper and more effective. Across both group, the average amount of money respondents said they would spend on a life jacket is 10,000 Tanzanian shillings (TZS), the equivalent of just over four United States dollars (USD). Most participants said they would attend swimming lessons and drowning first aid training if offered cheaply or free of charge. Almost all fishermen and over three quarters of community members said they would volunteer in a community-based search and rescue operation.

We also asked fishermen about mobile phone usage in their community, and the scope for communication-based interventions (Table 8.2). The majority of fishermen did not have a phone that could receive messages (for example with weather warnings) via the internet. Over 70% said that mobile network coverage was not good enough for them to reliably receive text messages (via short message service; SMS) whilst out fishing, but an equal number said that the reliability of the network would influence their decision in choosing a mobile provider.

Table 8.1: Perceptions of drowning prevention strategies.

VARIABLE	FISHERMEN (N = 300)	COMMUNITY MEMBERS (N = 301)	TOTAL (N = 601)
<b>Adequate measures in community to prevent drowning</b>			
Yes	47 (16%)	44 (15%)	91 (15%)
No	253 (84%)	257 (85%)	510 (85%)
<b>Further interventions required</b>			
Yes	299 (100%)	299 (99%)	598 (100%)
No	1 (0%)	2 (1%)	3 (0%)
<b>Should be laws on boat maintenance</b>			
Yes	292 (97%)	286 (95%)	578 (96%)
No	8 (3%)	15 (5%)	23 (4%)
<b>Would attend boat maintenance training</b>			
Yes	288 (96%)	249 (83%)	537 (89%)
No	12 (4%)	52 (17%)	64 (11%)
<b>Top three factors most likely to encourage lifejacket use</b>			
More affordable	290 (97%)	282 (94%)	572 (95%)
More widely available	281 (94%)	283 (94%)	564 (94%)
Greater variety of sizes	249 (83%)	251 (83%)	500 (83%)
More comfortable	233 (78%)	229 (76%)	462 (77%)
More attractive looking	200 (67%)	203 (67%)	403 (67%)
More effective	274 (91%)	265 (88%)	539 (90%)
NA – already wear one	4 (1%)	2 (1%)	6 (1%)
NA – would never wear one	0 (0%)	3 (1%)	3 (0%)
<b>Amount of money willing to spend on lifejacket</b>			
Mean	16,110 TZS (7.2 USD)	12,434 TZS (5.5 USD)	14,269 TZS (6.3 USD)
Median	10,000 TZS (4.4 USD)	10,000 TZS (4.4 USD)	10,000 TZS (4.4 USD)
Range	1,000 – 100,000 TZS (0.4 – 44 USD)	500 – 100,000 TZS (0.2 – 44 USD)	500 – 100,000 TZS (0.2 – 44 USD)
<b>Would attend swimming lessons</b>			
Yes	269 (90%)	246 (82%)	515 (86%)
No	8 (3%)	48 (16%)	56 (9%)
NA – I can already swim	0 (0%)	7 (2%)	7 (1%)
Don't know	23 (8%)	0 (0%)	23 (4%)
<b>Would volunteer for search and rescue operation</b>			
Yes	292 (97%)	232 (77%)	524 (87%)
No	8 (3%)	69 (23%)	77 (13%)
<b>Would attend drowning first aid training</b>			
Yes	293 (98%)	279 (93%)	572 (95%)
No	7 (2%)	21 (7%)	28 (5%)
NA – I already know first aid	0 (0%)	1 (0%)	1 (0%)

Table 8.2: Phone usage among fishermen.

VARIABLE	FISHERMEN (N = 300)
<b>Phone able to receive weather alerts via internet</b>	
Yes	36 (12%)
No	227 (76%)
Don't know	14 (5%)
NA – don't have a phone	23 (8%)

Table 8.2 continued.

<b>Network coverage allows SMS delivery while out fishing</b>	
Yes	19 (6%)
No	213 (71%)
Don't know	45 (15%)
NA – does not have a phone	23 (8%)
<b>Reliability of network would influence network provider selected</b>	
Yes	214 (71%)
No	49 (71%)
Don't know	15 (5%)
NA – does not have a phone	22 (7%)

We asked all participants to select from a list of pre-specified drowning prevention interventions the three that they considered most likely to be effective in their community. We then asked them to select the three interventions that they thought would be most feasible to implement. In each case, we asked participants to rank the three interventions in order of priority. Table 8.3 shows the number (and percentage) of respondents 'voting' for each pre-specified intervention that they considered most likely to be effective. Table 8.4 shows the same for interventions considered by participants to be most feasible. In Table 8.5, we have created an overall ranking of perceived intervention effectiveness and feasibility taking into account the number of people 'voting' for each intervention and the weighting given.

Table 8.3: Top three potential drowning interventions considered most likely to be effective among fishermen and other community members.

	FISHERMEN			OTHER COMMUNITY MEMBERS		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
Improved life jackets	157 (52%)	63 (21%)	25 (8%)	166 (55%)	63 (21%)	31 (10%)
Swimming lessons	43 (14%)	73 (24%)	37 (12%)	23 (8%)	76 (25%)	45 (15%)
Search and rescue operation	8 (3%)	17 (6%)	28 (9%)	9 (3%)	25 (8%)	36 (12%)
Boat maintenance training	57 (19%)	68 (23%)	66 (22%)	27 (9%)	65 (22%)	61 (20%)
Severe weather warnings	13 (4%)	27 (9%)	45 (15%)	23 (8%)	15 (5%)	32 (11%)
Improved mobile network	7 (2%)	23 (8%)	39 (13%)	10 (3%)	13 (4%)	26 (9%)
Drowning first aid training	5 (2%)	12 (4%)	25 (8%)	5 (2%)	9 (3%)	20 (7%)
Drowning awareness training	8 (3%)	8 (3%)	26 (9%)	11 (4%)	13 (4%)	21 (7%)
Child-proof barriers around water	NA	NA	NA	27 (9%)	21 (7%)	30 (10%)
Lights on boats	2 (1%)	8 (3%)	10 (3%)	NA	NA	NA

Table 8.4: Top three potential drowning interventions considered to be most feasible to implement among fishermen and other community members.

	FISHERMEN			OTHER COMMUNITY MEMBERS		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
Improved life jackets	163 (54%)	58 (19%)	26 (9%)	147 (49%)	49 (16%)	40 (13%)
Swimming lessons	42 (14%)	76 (25%)	42 (14%)	38 (13%)	68 (23%)	45 (15%)
Search and rescue operation	10 (3%)	21 (7%)	33 (11%)	10 (3%)	28 (9%)	22 (7%)
Boat maintenance training	38 (13%)	65 (22%)	62 (21%)	28 (9%)	57 (19%)	59 (20%)
Severe weather warnings	18 (6%)	32 (11%)	35 (12%)	21 (7%)	21 (7%)	32 (11%)
Improved mobile network	11 (4%)	12 (4%)	44 (15%)	7 (2%)	16 (5%)	24 (8%)
Drowning first aid training	4 (1%)	20 (7%)	30 (10%)	14 (5%)	13 (4%)	22 (7%)
Drowning awareness training	13 (4%)	12 (4%)	24 (8%)	13 (4%)	24 (8%)	26 (9%)
Child-proof barriers around water	NA	NA	NA	23 (8%)	25 (8%)	31 (10%)
Lights on boats	1 (0%)	3 (1%)	5 (2%)	NA	NA	NA

Both fishermen and other community members considered that improved life jackets would be the most effective intervention, followed by boat maintenance training and then swimming lessons. While they considered that improved life jackets would also be most feasible, they felt that swimming lessons were more feasible than boat maintenance training.

Table 8.5: Ranking of potential interventions by perceived effectiveness and feasibility according to frequency and order of response.

	FISHERMEN		OTHER COMMUNITY MEMBERS	
	Effectiveness	Feasibility	Effectiveness	Feasibility
Improved life jackets	1	1	1	1
Boat maintenance training	2	3	2	3
Swimming lessons	3	2	3	2
Severe weather warnings	4	4	5	5
Improved mobile network	5	6	7	9
Search and rescue operation	6	5	6	7
Drowning awareness training	7	7	8	6
Drowning first aid training	8	8	9	8
Lights on boats	9	9	NA	NA
Child-proof barriers around water	NA	NA	4	4

### 8.3 Perceived acceptability and feasibility of potential interventions from FGDs

#### Brief demographics of respondents

Six FGDs, each including eight to 10 participants, were conducted across six fishing communities (Bezi Kisiwani, Chakazimbwe, Chifule Ukara, Ghana, Kijiwani, Ruhanga). The total number of participants was 55 (48 male; seven female), and ages ranged from 22 to 58 years (median 36). Most (n = 39) were fishermen, but other community members (n = 16) were also included. Of the other community members, one was a BMU chairman, one was a boat owner and eight others also worked in the fishing industry. FGDs explored perceived drowning risks among fishermen, women, and children, potential interventions, and the acceptability and feasibility of suggested interventions.

#### Thematic findings: perceptions of potential interventions

Major overarching themes discussed in FGDs were drowning risks and prevention. Risk-related deductive and inductive themes were sub-categorised as (1) who is most at-risk of drowning, (2) drowning risks for fishermen and (3) drowning risks for women and children in fishing communities. Because findings of these sub-categories overlapped with, and were consistent with, findings from IDIs and FGDs in previous chapters, only brief data are shown. Prevention-related deductive and inductive themes were sub-categorised as (1) current prevention efforts, policies, and actors, (2) prevention ideas, feasibility, and effectiveness for fishermen, (3) prevention ideas, feasibility, and effectiveness for women and (4) prevention ideas, feasibility, and effectiveness for children.

#### Greatest risk of drowning

Consistent with previous chapters, there was a general consensus among FGD participants, who were mostly fishermen, that fishermen were at greatest risk of drowning in their community because they earned a living in the water. Some participants also mentioned the risk to young children, who were insufficiently supervised at the lakeshore. Few mentioned women, except in the context of accidents among passenger boats or wading into deeper water while collecting catches from fishing boats.

*"...fishermen are the most vulnerable to drowning. Why do I say so? Because most of their activities are conducted in the waters and, when going in the water with poorly maintained boat and without lifejackets, they may encounter storms. They face a high risk of drowning."* (FGD\_3, Chifuli Ukara)

### *Drowning risks for fishermen*

The major causes of drowning among fishermen were described as one or a combination of unexpected storms, unsafe boats, lack of legally-mandated life-jackets and fire-suppression equipment, untrained/inexperienced fishermen, and use of alcohol/drugs, consistent with previous chapters.

*“The reasons that enhance the vulnerability of the fisherman to drown are as follows; firstly, they use small vessels, secondly they are normally drunk while in the lake as they drink alcohol/drugs and these are the biggest causes of drowning.”* (FGD\_3, Bezi Kisiwani)

*“Another cause is that fishermen use equipment they cannot operate. You find five people in a canoe and only one can paddle and operate it ...When setting the nets, there must be one who can hold the rope, but if he holds badly it can cause one to drown in case of harsh winds. So, ignorance too is also a cause.”* (FGD\_3, Bezi Kisiwani)

### *Drowning risks for women and children*

The major causes of drowning among women were described as unsafe passenger boats (e.g. overloaded, lack of functional or accessible life-jackets) and inappropriate behaviour in water (e.g. screaming and behaving unsafely, wading too deep).

*“These women cannot swim because ...a large proportion are not used to activities conducted in near water. But there are other women who were born in islands. These can swim because they are always near the waters.”* (FGD\_3, Chifule Ukara)

The major causes of drowning among children were described as insufficient supervision, as young children lacked risk awareness around water and were not capable or strong enough swimmers to save themselves.

*“We have lost so many children here because of drowning. You find children playing at the shores. Their mothers are too busy to attend them. So they lack security and supervision, they end up wandering away and drowning.”* (FGD\_3, Chakazimbwe)

Others indicated that this was largely because children were expected to do household chores that put them at risk.

*“I also think that children drowning is a problem caused by parents, as they allow their children to swim offshore and wash cooking utensils. That’s why they get such problems.”* (FGD\_3, Ruhanga)

Some blamed the fact that many women exchanged sex for money, indicating this made them neglectful mothers.

*“Children are affected because of poverty. Their mothers come to these shores to be sex workers. They are prostituting for money and therefore have no time for their children. Now, we all know that children are adventurous. So, because of no supervision, they find themselves in the water...”* (FGD\_3, Chakazimbwe)

### *Current drowning prevention policies, and actors*

Participants agreed that existing laws were not being enforced or obeyed. Most indicated this was due to lack of mandate and enforcement staff among relevant agencies (e.g. SUMATRA and BMUs), and boat owners trying to save money, though some indicated that local corruption worsened these issues.

*“The law is clear on the issue of safety; the boat is required to have a fire extinguisher, a blanket, and floaters. If one has ten boats, then he should stock forty high-standard floaters. No, you wonder where these floaters resurface from when SUMATRA come around; everyone actually wears life jackets! Now that means that if the law is implemented, then there will be safety. The problem is that SUMATRA are only concerned about passenger boats, they don’t care about the fishermen who sail to the deep waters. The boat is supposed to be inspected*

*fully, very well, such that if it lacks anything it is barred from sailing. All these should be implemented, and you will realize that this place can be safe for the fishermen.” (FGD\_3, Chakazimbwe)*

The BMU’s role was understood differently by many participants, some indicating that the BMU should enforce the rules as they were present locally (unlike SUMATRA, who came irregularly), while others insisted that this was beyond the BMU’s mandate and capabilities.

*“From my understanding, the BMU deals with unlawful fishery. So, the government should enforce the bylaw of canoe owners to buy life-jackets because the BMU can’t do so.” (FGD\_3, Kijiwani)*

*“I must say that the boat owners are up against the BMU and defy them. The BMU have no power; they are completely toothless. They deserve to be treated better. See, if that BMU chairman dares to go to the lake to stop any boat from sailing, they will finish him. So, all I am saying is that the BMU should be more empowered so as to succeed.” (FGD\_3, Chakazimbwe)*

*“SUMATRA comes here once per year. Therefore, once they come, for example today, people will wear life-jackets. However, if a canoe sinks, SUMATRA have no way of knowing whether they had life jackets or not” (FGD\_3, Chakazimbwe)*

Many participants indicated that community and government leadership were more interested in profits, even if illegal, than in the safety of fishermen.

*“Leaders are not interested in fishermen and don’t bother about their death. Instead they are interested in people who benefit them financially, and you will find a chairperson with somebody... secretary with somebody ...as well as other members bribing.” (FGD\_3, Kijiwani)*

Similarly, many participants accused boat owners of being ‘greedy’ and not caring about the lives of the fishermen who worked for them.

*“There are two groups, the owners of the boats and the real fishermen. The owners do not go to fish in the lake, although they call themselves fishermen. The fishermen I am talking about are those... referred to as ‘soldiers.’ If you look at the records of fishermen, you will not find the names of the boat owners; so, it is the ‘soldiers’ that are at risk of drowning.” (FGD\_3, Chakazimbwe)*

*“I feel that it is within the jurisdiction of the boat owners to ensure a safe working environment of the fisherme. But there is nothing of that sort so far; completely no effort to ensure our safety.” (FGD\_3, Chakazimbwe)*

Participants noted that neither leadership nor the community took responsibility for drowning or improving fishermen’s work conditions, as those who cared about them lived far away.

*“Generally, there is no collaboration between leaders and community members to deal with the matter of drowning death. When the person drowns, nobody bothers to find out how to save the person. Instead the relatives will come from far to find the dead body.” (FGD\_3, Kijiwani)*

*“Nothing will be done when a fisherman dies of drowning; people will continue with their businesses. The dead body will wait for relatives, for further procedures, without any leadership assistance or even community contributions.” (FGD\_3, Kijiwani)*

FGD participants made clear that, without significant efforts to increase the authority and legitimacy of enforcement agencies, new legislation or policies to protect fishermen would be as unsuccessful as existing ones.

### *Drowning prevention for fishermen*

Fishermen had contradictory views on effective prevention, with most describing it as the government's or the boat owners' responsibility. Several admitted to risky behaviours, and indicated these were common, including not checking boats for damage, not using life-jackets or knowing how to swim, and using alcohol and drugs while boating. They blamed this on poverty and the stresses of their lives; and indicated that if someone complained (e.g. about a damaged boat, lack of life-jacket or drunken colleague) they would be labelled trouble-makers, not allowed to fish, and therefore could not earn any money. The most common prevention interventions suggested were life-jacket provision, swimming lessons, boat safety enforcement, sobriety enforcement, and rescue boats.

#### Life jackets:

Fishermen had mixed views on lifejackets, ranging from them being unavailable/unaffordable, to ineffective and only useful for locating drowned bodies. It appeared that most boats lacked sufficient life-jackets and many that were in use were not fit-for-purpose. Thus, most fishermen saw no reason to use them. However, participants did not know where to buy an effective life-jacket or how much it would cost.

*"...you may have life jackets, but these life jackets cannot sustain you for long. Very soon they sink with you and you drown. The only advantage you have is that the colour of these life jackets is very visible, so the life jackets only help to locate your body when it floats."* (FGD\_2\_Bezi Kisiwani)

Participants generally agreed that if life-jackets could be made available locally at heavily-subsidised prices then they would consider buying them to help protect themselves. However, several insisted that life-jacket purchasing and provision should be the boat owners' responsibility.

#### Swimming lessons:

Views were also mixed on the value of swimming skills, with some indicating that such skills were insufficient to save oneself in deep water and others suggesting that strong swimmers became overconfident and put themselves at risk. Participants generally agreed that a specific area should be separated for people to learn how to swim and lessons could be provided by skilled community members, though in some areas this was considered unlikely due to lack of support or simple logistics.

*"It is not easy to seclude a place for swimming lessons at the beach. You know we are surrounded by an animal reserve; it's a reserve for crocodiles. OK, now imagine, how do you seclude an area to learn how to swim in an area surrounded by crocodiles? It makes sense to find a different strategy rather than swimming."*

#### Enforcement:

Participants identified this as a public good that required government intervention, as fishermen had no negotiating power or political voice, while boat owner's and local officials benefitted financially from lack of enforcement of existing safety rules. Few believed that anyone was interested enough in their welfare to make any changes, with several even requesting that FGD facilitators advocate with government on their behalf. Many called for vague 'education' initiatives to teach fishermen what they should do (e.g. to improve their environment and working conditions), as they described themselves as uneducated and therefore unable to advocate for themselves or enact any community-level changes.

#### Rescue boats:

Several participants suggested local rescue boats, though most were unsure which agency would host them or who would pay for and man them. As with enforcement, most did not see this as something they could afford or organise themselves.

The most acceptable and feasible suggestions appeared to be provision of a government scheme for fishermen to purchase effective and affordable life-jackets, identification of a safe area and teachers for community swimming lessons, and government enforcement of existing laws on boat safety and life-jacket usage while on board.

### *Drowning prevention for women*

The most common prevention interventions suggested for women were passenger ferry safety enforcement (e.g. providing life-jackets), swimming lessons, banning women from shoreline villages, and shallow docking (e.g. of sardine boats). All suggestions had potential challenges with acceptability, while some were impractical or inequitable, e.g. banning women.

#### Ferry safety enforcement:

Participants reported that ferry life-jackets were often stored away and inaccessible, and boats were frequently unsafe and overloaded. Some suggested that women should be responsible for checking ferry safety, or else travel by land, since owners were unreliable.

*“A woman should be ready all the time by putting on a life jacket because they can encounter wind storms any time so it can be overweighed. So she must also check the weight carried by canoe against canoe’s weight to avoid the danger that it may encounter on the way...”* (FGD\_3, Kijiweni)

However, most indicated that ferry owners should be responsible for passenger safety though this would only be enforced through government intervention.

#### Swimming lessons:

Some participants suggested teaching women to swim, though most indicated that most women did not spend enough time in the water for this to be the most feasible or acceptable intervention.

*“If it is a woman, it is good she knows how to swim as she may one day be involved in a boat accident and thus be able to save herself.”* (FGD\_3, Ruhanga)

#### Banning women:

Several suggested banning women from fishing communities, since they came to earn money for sex and were unnecessary. However, this was not described by most as a feasible solution.

#### Shallow docking:

A relatively simple solution proposed for reducing drowning when women collected sardines was anchoring boats closer to shore when offloading, though participants agreed that this would require a government mandate as fishermen were unlikely to make this change otherwise.

*“...every canoe should anchor near the shallower depth for women to collect sardines. To achieve this, we need cooperation among ourselves instead of having conflict of interests.”* (FGD\_3, Kijiweni)

The most acceptable and feasible suggestions appeared to be passenger ferries safety enforcement (through ensuring all ferries were regularly certified as fit-for-service and all passengers wore effective life-jackets while on board) and shallow docking when offloading sardine catches. However, both would require changes in policy and practice by government and community leadership, to ensure any new guidelines were followed, penalties enacted for lack of compliance, and perceived corruption reduced.

### *Drowning prevention for children*

The most common prevention interventions suggested for children were teaching children to swim, banning them from the shoreline, building fences to prevent their access, beating all children found along the shoreline, and punishing mothers who allowed their children to stray. Women were primarily blamed for the risk to children, i.e. for having babies yet not sufficiently supervising them while working, with several participants suggesting banning all mothers and non-working children. However, most agreed that suggestions to ban women and children from lakeside communities or beat other people's children were not practical or equitable. Similarly, most agreed that building fencing to cover the whole shoreline would be prohibitively expensive, could interfere with beaching boats, and would not prevent children from sneaking through.

*“Even those who tell us to protect children; will any person follow their child everywhere they go to play? If you are at the shore with your child, will you carry him when you want to go to the toilet? Simply put, you cannot fully monitor a child.”* (FGD\_3, Chifule Ukara)

#### Swimming lessons:

While all agreed that children raised along the shoreline should learn to swim, most stated that children already learned to swim on their own and those at greatest risk were the very young children who were not yet able or strong enough to swim effectively.

*“You think it is possible to train a child how to swim? I think it is not possible to teach a small child how to swim.”* (FGD\_3, Chifule Ukara)

#### Banning/Punishment:

Many suggested that children, and even pregnant women, could be banned from the shore as long as consequences were known and enforced.

*“A law should be made to prohibit children from being seen at the shore, but if we only leave the responsibility to [each] one, it won't work. But if the law applies, then when a child is seen at the lake shore the mother should be highly fined; then it can work.”* (FGD\_3, Chifule Ukara)

However, others described this as unreasonable, given children were often unsupervised, and avoiding the lake entirely could prevent children from learning necessary survival skills.

*“I grew up beside the lake. So if a child is born there he learns to play near the lake, and there they learn how to survive in case of accidents. It's impossible for a child to grow up near the lake without going near it.[...] We as children had to learn how to swim. There is a saying in Swahili which says 'the child of a snake is a snake' so one cannot be born at Ruhanga and not learn how to swim; it's bad.”* (FGD\_3, Ruhanga)

Additionally, as the proposal relied on mothers and no mothers participated in FGDs, their perspectives on acceptance and feasibility were not included.

#### Fencing:

Several participants similarly suggested that fencing the shoreline could work, but others were quick to point out that costs would be too high for the community.

*“[A fence] will really help to reduce the drowning rates of children. It will also offer security for our boats because they are normally stolen. So it is a very effective way, as the barrier will have gates that are only open at certain times.”* (FGD\_3, Ghana)

Others noted the impracticalities, costs, and inconvenience to fishermen.

*"I doubt that the fishermen will agree to that; that you barricade the whole beach and leave only two gates to access the beach. The fishermen will feel like they have been enclosed in a cattle shed [...] I am speaking the truth; they will feel restricted. This will not be an island anymore because their freedom to access the shores will be limited."* (FGD\_3, Ghana)

*"It is impossible to build the fence if the costs are to be covered by us. Maybe, if the government builds it, that's ok. It will be too costly for us to fence such a long shore, so that will not be possible at all here."* (FGD\_3, Chifule Ukara)

*"We need space in the shore; space to repair our boats. Now, if you build a fence here, we will be required to carry the boat for long distances in order to repair it. That is very inconvenient for us. We need this space"* (FGD\_3, Chifule Ukara)

#### School/Organised supervision:

A few noted that the environment was not conducive to the welfare of children, describing the lack of schools, that parents were always busy, and that house helpers were not always available.

*"I feel that all we need is established schools so that all the children can simply stay at school. That is a simple solution to a simple problem."* (FGD\_3, Ghana)

*"...This area, as you can see, has no schools or anything like that. Sometimes I feel that we are denying the children of their rights."* (FGD\_3, Chakazimbwe)

As women were identified as being primarily responsible for children, but were not included in FGDs, fishermen described feasibility and acceptability from their own perspectives. Participants thus put more emphasis on banning children and training mothers than on finding safer alternatives for them. Thus, the most acceptable suggestions appeared to be banning children under age five from the shoreline and ensuring older children knew how to swim. The suggestion of providing some form of childcare/school so that children could be occupied while mothers worked, was not fully discussed. However, banning or fencing out children was considered difficult but possible, while building a school required funds and infrastructure that fishermen said they did not have.

## 8.4 Discussion

Most fishermen and other community members participating in this study felt that there are not adequate measures to prevent drowning in their communities. Almost all thought that further interventions are required. In this chapter (under objective 5), we sought to explore acceptability and perceived feasibility of potential drowning interventions in Tanzanian fishing communities on Lake Victoria.

Data from multiple objectives across this study demonstrate that life jacket usage in these fishing communities is low. In the participant survey for objective 5, most respondents said they would wear life jackets if they were cheaper, more widely available and more effective. However, it is difficult to interpret these data and assess their reliability due to mixed feedback on reasons for non-use of life jackets in interviews and FGDs. Boat owners say they provide lifejackets and fishermen don't use them. However, fishermen say that life jackets are either not provided, or that they are provided but the owners keep them inaccessible. Fishermen also frequently report that the life jackets bought by boat owners are very poor quality so not worth using. BMUs reported during our site visits that fishermen are required to wear life jackets, but this clearly needs to be better enforced. Other study respondents reported that there are laws on life jacket usage, but that the government is only concerned with passenger boats, not fishing boats. Despite the mixed reports, improved and affordable life jackets (and enforcement of wearing life jackets) were considered the intervention most likely to be effective and feasible among fishermen and other community members.

Most drowning incidents occurring within these fishing communities over the past two years involved boats, and many people described poorly maintained boats as a key risk factor for drowning. In the participant survey, most respondents said that they would like to see stricter laws on boats maintenance, and that they would attend boat maintenance training if offered cheaply or free of charge. Boat maintenance training was ranked as the intervention second most likely to be effective in preventing drowning, but the third most feasible, by both fishermen and other community members.

However, we observed some conflict between fishermen and boat owners over maintenance of boats. Fishermen felt that it was the boat owner's responsibility to maintain their fishing boat, but they do not adequately do this. They also reported feeling that boat owners do not care about protecting the fishermen who use their boats, and that the fishermen have no control as they must go out in the lake to work. The boat owners, on the other hand, reported that boat maintenance was difficult because of financial restraints. Teaching basic boat maintenance skills to the fishermen who use the boats may give them more control, as well as the ability to address problems occurring with boats when they are out in the lake. However, more substantive boat maintenance training should be offered to the boat owners, who have ultimate responsibility for the boats. In FGDs, respondents strongly felt that the government needs to improve enforcement of laws on boat maintenance and safety.

The majority of survey respondents said they would attend swimming lessons if offered cheaply or free of charge, even though most people reported that they could already swim (under objective 2b). Swimming lessons were ranked as the second most feasible intervention, but the third most likely to be effective by both fishermen and other community members. In FGDs, participants also highlighted identification of a safe area and teachers for community swimming lessons as a potentially effective and feasible intervention.

Severe weather warnings were considered by fishermen as another potentially effective and feasible intervention. Findings from previous chapters demonstrate that, while many fishermen do not go out fishing in bad weather, most will not return to shore if the weather turns bad while they are already fishing. This highlights a need for fishermen to access weather forecast while out on the lake. There have been previous initiatives to deliver weather warnings to smart phones in Ugandan fishermen, but it was later reported that most Ugandan fishermen did not have smart phone<sup>8</sup>. The same was found to be true in the current study, with most respondents not having a smart phone or phone that supports internet. An alternative strategy would be to deliver weather warning via text message (SMS). However, this relies on network availability, and reports from our respondents on network availability on the lake are variable.

Community members ranked barriers for preventing children from going in or near the lake reasonably high in terms of potential effectiveness in reducing drowning risk and feasibility for implementation. However, there were contradicting comments from FGDs and interviews. Many people noted that physical barriers would be obstructive to other activities going on around the lake shores, and some said that they would not be effective in any case as children would sneak through. Many people felt that children (and even women) should be banned from the lake shore. However, most accepted that this was not practical.

Under this objective there was a tendency for people to say they would support all interventions discussed. This may be an optimistic view or reflect social desirability bias (whereby respondents answer questions such that they will be viewed favourably by the researcher), and support may thus be lower in reality. For example, in Uganda there was an initiative to redesign life jackets to make them more acceptable to fishermen<sup>2</sup>. While this may have improved usage to some extent (usage in Uganda appears much higher than in Tanzania), there is a still significant proportion of fishermen who do not use them<sup>3</sup>. To attempt to overcome this limitation, we asked participants to rank interventions, thus preventing them from responding equally positively to all interventions proposed. Indeed, while most people said they would attend first aid training or volunteer for a search and rescue operation, these interventions were ranked lower than others in perceived effectiveness and feasibility.

As well as evaluating community perceptions of potential interventions, we were also able to draw on our own observations from previous chapters in order to identify potential intervention targets. One such observation was a lack of knowledge and awareness on drowning among the communities. For example, participants did not consider male community members as an at-risk group and few people knew what steps to take in the case of a drowning incident.

Thus, while drowning awareness and first aid training were not ranked highly as potential interventions by study participants, we consider that these would potentially be easy and effective strategies to reduce drowning risk.

Similarly, we observed a lack of lights on boats at night as a key risk factor for drowning in these communities. The majority of drowning deaths occurring over the past two years occurred at night and, of those, lights were available in only half of cases. Similarly, our boat observations showed that most boats going out at night did not have lights. We heard numerous reports of boat collisions at night because of a lack of lights and some people reported fishermen turning off lights at night so that they could sleep. While fishermen ranked 'lights on boats' last out of our list of potential drowning intervention strategies, we consider that this could actually be an important target.

Among children, we identified inadequate supervision as a key risk factor for drowning. Most children who drowned over the past two years did so because they were swimming or playing in water without adult supervision. Also, survey data show that most children in these communities commonly go in or near the water unsupervised. Some reports from objective 4 (chapter 7) indicate that mothers are blamed for deaths of children due to inadequate supervision. Respondents in interviews and FGDs for objective 5 also described lack of supervision as a risk factor for drowning among children, although perspectives differed, with some people saying it is not possible to observe children all the time, but others saying that mothers 'forget' their children when they are busy with other activities. We therefore consider that there is a need to educate community members on risks of water for children without supervision, and to work with mothers and other caregivers to find ways of improving supervision of children, recognising that supervising children is difficult while performing other chores and work. Furthermore, children themselves could be targeted for educating about risks of going in or near the water without an adult.

The data on potential interventions to reduce drowning deaths among children in the current study are limited by the low number of women and lack of mothers included in the FGDs. Thus, perceptions on potential interventions were provided mostly by fishermen, who are likely to have had a biased approach. Further FGDs including only mothers and other caregivers, and focusing specifically on drowning interventions for children, would be interesting.

## CHAPTER 9: GENERAL DISCUSSION AND CONCLUSIONS

### 9.1 Key study findings and implications

This study provides substantive evidence that drowning is a significant threat within fishing communities surrounding the Tanzanian shores of Lake Victoria. The incidence of drowning among specifically fishermen in these communities is almost 200-fold higher than the estimated incidence for the African continent more generally<sup>1</sup>. Even among other community members (i.e. members of fishing communities who are not fishermen), the incidence of drowning is on par with the national incidence of deaths due to tuberculosis and malaria in Tanzania<sup>9, 10</sup>. With an estimated population of 1.3 million people living in lakeside fishing communities around Lake Victoria, 60% of whom reside in Tanzania, the estimated drowning incidence in this study equates to an average of five deaths occurring every day on the Tanzanian shores of the lake.

Furthermore, reported impacts of drowning deaths among these communities on family members and colleagues were varied and considerable. Impacts on families ranged from loss of income to family breakdown, whereas impacts on colleagues included loss of jobs and acquired responsibility to care and provide for the family of the deceased. It was not within the scope of this study to attribute a quantifiable monetary loss to drowning deaths occurring in Tanzanian lakeside fishing communities. However, given that most deaths were among fishermen and that, in these communities, men are typically the primary breadwinners within their families and have multiple dependents, such a sum would likely be significant.

While drowning has in recent years been identified and publicised by the WHO as a major but neglected public health threat, most attention, research and prevention strategies to date have focused primarily on children. Indeed, worldwide, it is persons aged 25 and under (and particularly children aged one to four years), who are most at risk<sup>1</sup>. However, this study clearly highlights fishermen and wider fishing communities, whose lives are spent living and working on and around water, as other key at-risk populations. This study focused only on fishing communities on the shores of Lake Victoria in Tanzania. However, it is possible and plausible that a similar threat exists in Ugandan and Kenyan fishing communities around Lake Victoria, as well as other fishing communities surrounding large lakes (and also sea-side communities) in East Africa and Africa more generally.

At a national level, the burden of drowning and social and economic impacts identified in this study highlight drowning among Tanzanian Lakeside fishing communities as a public health priority for government officials and policy makers in Tanzania.

This study has identified a number of risk factors and risk-taking behaviours associated with drowning in Tanzanian fishing communities around Lake Victoria. These include risk factors associated with previous deaths from drowning, risk-taking behaviours reported by fishermen and other community members, and risk-taking behaviours among fishermen observed by our research team. Key risk factors and risk-taking behaviours among fishermen included non-use of life jackets, fishing in bad weather, fishing at night without lights, and fishing in small and poorly maintained boats. Risk factors and risk-taking behaviours among other adult community members included taking small, overloaded and/or poorly-maintained boats for transport, non-use of life jackets and alcohol intoxication when in or near water. For children, most common risk factors and risk-taking behaviours included a lack of barriers preventing children from going in or near water, and poor supervision.

Consideration of potential intervention strategies in this study took a two-pronged approach. First, participant perceptions of potential effectiveness and feasibility of various interventions were explored. Secondly, observations from other parts of the study (for example identification of risk factors and risk-taking behaviours) were used by researchers to evaluate potential targets for interventions. Participant perceptions were highly variable. Factors commonly considered to negatively impact on effectiveness and feasibility included cost, practicalities, community support and lack of enforcement. Ultimately, the most acceptable and feasible suggestions for risk-reduction in fishermen were considered to be provision of a government scheme for fishermen to purchase effective and affordable life-jackets, identification of a safe area and teachers for community swimming lessons, and government enforcement of existing laws on boat safety and life-jacket usage while on board. For women, the most acceptable and feasible

suggestions appeared to be safety enforcement in passenger boats, and shallower docking when offloading fish. For children the most acceptable suggestions appeared to be banning children under age five from the shoreline and ensuring older children know how to swim. For many of the proposed interventions, participants felt that accompanying changes in policy and practice by government and community leadership were essential.

From researcher observations, additional suggested interventions to reduce drowning risk include drowning awareness and drowning first response training, improved use of lights on boats out fishing at night, and improved strategies for supervision of children during the daytime when mothers are busy with chores and/or work.

Interestingly, in this study the risk of drowning was perceived by participants to be broadly equivalent to, or higher than, the risk of other health threats in these lakeside communities, such as HIV, malaria and schistosomiasis. This finding was observed among both fishermen and other community members. Strikingly, although the perceived risk of both drowning and HIV were high, and although participants reported fearing these health threats, risk-taking behaviours for both were common. Participants appeared aware of potential risk-reduction strategies, yet did not feel it was worth the effort, expense or sacrifice to implement them. This likely reflects a general risk-taking behaviour and attitude among fishermen and some other community members in these communities, rather than a behaviour/attitude specific to drowning and/or HIV infection.

Reasons for this are probably mixed and complex. In some cases, fatalistic attitudes were observed, whereby participants (particularly fishermen) reported having little or no control over their life/fate, so saw no benefit in risk-prevention strategies. In others, poverty was held accountable for an 'inability' to implement risk reduction strategies. For other respondents (again, particularly fishermen), a high emphasis was placed on enjoyment, whereby participants choose a path that is more enjoyable even if they know it is more risky. Among women, the effect of a gendered society appeared to play a major role in whether or not risk reduction measures were taken, with women having little decision-making power. These findings highlight a complexity in perceptions, priorities and cultures (all likely interlinked) within the lakeside fishing communities that may impact on effectiveness and acceptability of potential drowning interventions, and that should be considered in terms of delivery of potential interventions.

## 9.2 Strengths and limitations of study

This a large and unique study, providing considerable amounts of data on drowning deaths, risk factors and perceptions among lakeside fishing communities in Tanzania. Strengths and limitations of the study have been discussed in detail in each of the results chapters and are therefore only summarised here.

In this study we sought to identify all cases of deaths occurring within each of the targeted communities over the past two years. This approach provides a simple method of obtaining incidence estimations, whereby the number of deaths identified is the numerator, and the entire population (over the past two years) is the denominator. Identifying all deaths reduces the likelihood of responder bias (as there is less risk of data being collected from a particular demographic of responder), and the time limit reduces the likelihood of recall bias. These are close-knit communities, in which we considered it feasible to identify most or all drowning deaths occurring over the past two years. Data collection continued until saturation, providing reassurance that all deaths were identified, although it is still possible that some were missed. In this study we also took measures to ensure the same deaths were not counted more than once, thus ensuring reliability in our death counts.

Obtaining reliable population estimates was challenging, partly because of a lack of reliable census data, and partly as these are very transient communities. However, to reduce potential impacts on our data, we firstly sought to validate the population estimates using a method generated to establish population sizes among similar communities from previous studies conducted by MITU and LSHTM. Secondly, we performed sensitivity analyses allowing for both inflated and reduced population sizes. These did not alter our findings considerably.

Another consideration in obtaining drowning incidence estimations was the residence-status of the drowning victims. Many victims were not permanent residents in the communities where they died, and this was to be expected given the transient nature of these populations. However, to increase the likelihood that all identified victims were at least



temporary residents, we only included accounts of deaths where community members knew at least a limited amount of information about the victim and the circumstances of the death (and thus the victim must have resided in the community for at least a short period of time). Cases of drowning victims being washed up on shores were reported, but these were not included in our incidence estimations.

Our survey data provides detailed information on risk-taking behaviours, perceived health risks, and perceptions of potential drowning interventions from a very large number of fishermen and other community members. This is a highly unique and interesting dataset. There is some scope for selection bias as participants were in part self-selected and may therefore have been more likely to participate if they already had some interest in or experience of drowning. This would have been avoided using a study design with a different selection approach, for example a house-to-house survey. However, it was also important for this study to include participants who lived and worked near the water and had some knowledge of drowning.

Within our surveys there was also some scope for responder or social desirability bias, whereby participants gave answers that they felt the researcher wanted them to give, or that the researcher would view favourably. However, our mixed-methods approach to the study limits the effect of this. The FDGs and IDIs drew on more complex ideas and perceptions and encouraged discussion among participants, and our researcher observations were completely independent.

### 9.3 Conclusions and recommendations

In conclusion, this study clearly demonstrates that drowning is a significant health threat among these Tanzanian fishing communities on Lake Victoria, with fishermen most at risk. Fishermen and the wider communities consider their risk of drowning to be high, yet risk-taking behaviours are common practice. At the national level, drowning among these high-risk populations should be considered a public health priority within Tanzania, and authorities should engage in potential intervention strategies. 'Next-stage' intervention studies within the same communities would be useful to guide decision-making on drowning prevention by policy makers. More widely, similar populations (i.e. those living and working on large water bodies) worldwide, but particularly in other low- and middle-income regions, should be considered as groups potentially at high risk from drowning.

## ACKNOWLEDGMENTS AND DISCLAIMER

### Contribution of authors

The DRIFT study was led by Principal Investigator HW, with support from Co-Investigators DWJ, CH, HG and SK. Day to day management was conducted by Study Coordinator JP. Field activities and data collection were performed by Research Assistants AM, OR, MM and HM under the supervision of JP. Statistical analyses and preparation of quantitative data tables were performed by CH, PA and HW. Qualitative data were coded and analysed primarily by NH and AM, with additional support from JP, OR, MM and HM. This report was prepared by HW, but all authors provided input. HW assumed responsibility for the final content of the report.

### Contribution of other persons or parties

Abdul Ngaranga and Francis Kapinga (both previous MITU employees) worked as Research Assistants, contributing to field activities and data collection for a short period of time. Dominic Mikulski, Martin James and Lucy Howard (all current or previous LSHTM employees), and Thabitha Daudi, Gaga Lupanda and Yesse Mazanda (all current MITU employees) provided administrative support for the study. Ramadhan Hashim and Ezekiel Mgema provided data support, including programming of data collection tablets and data cleaning.

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### Disclaimer

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## REFERENCES

1. WHO Global Report on Drowning: Preventing a Leading Killer. Geneva: World Health Organisation. 2014. ISBN9789241564786.
2. Designs without Borders. Redesigning lifejackets for Ugandan fishermen. <http://www.designwithoutborders.com/projects/redesigning-lifejackets-for-ugandan-fishermen/>. Last accessed 12 April 2018.
3. Kobusingye, Tumwesigye, Magoola *et al.* Drowning among the lakeside fishing community in Uganda: results of a community study. *Int J Contr Saf Promot.* 2016; 4:1-8.
4. Kobusingye, Guwatudde and Lett. Injury patterns in rural and urban Uganda. *Inj Prev.* 2001;7:46-50.
5. Asiki, Mpendo, Abaasa *et al.* HIV and syphilis prevalence and associated risk factors among fishing communities of Lake Victoria, Uganda. *Sex Transm Infect.* 2011;87:511-515.
6. Wengelin and de Wet. A conceptual paper on the benefits of a non-governmental search and rescue organisation. *Biomechanics and Medicine in Swimming XI.* Chapter 6. *Medicine and Water Safety.* 2010. Pg 384-386.
7. Life Lines at Lake Victoria. A communications project executed by Zain, Ericsson and GSMA Development Fund. [https://www.ericsson.com/assets/local/about-ericsson/sustainability-and-corporate-responsibility/documents/download/communication-for-all/lake\\_victoria\\_project.pdf](https://www.ericsson.com/assets/local/about-ericsson/sustainability-and-corporate-responsibility/documents/download/communication-for-all/lake_victoria_project.pdf). Last accessed 12 April 2018.
8. Tushemereirwe, Tuhebwe, Cooper *et al.* The most effective methods for delivering severe weather early warnings to fishermen on Lake Victoria. *PLoS Curr.* 2017;9.
9. United Republic of Tanzania: WHO statistical profile. World Health Organisation. Last updated January 15. <http://www.who.int/gho/countries/tza.pdf?ua=1>. Last accessed 12 April 2018.
10. Global tuberculosis report 2017. Geneva: World Health Organization; 2017. Licence: CC BY-NCSA 3.0 IGO. ISBN 9 789241 565516.
11. United Republic of Tanzania. World Health Organisation. Noncommunicable Diseases (NCD) Country Profiles. 2014. [http://www.who.int/nmh/countries/tza\\_en.pdf?ua=1](http://www.who.int/nmh/countries/tza_en.pdf?ua=1). Last accessed 12 April 2018.
12. United Republic of Tanzania. World Health Organisation. Road Traffic Injuries Country Profile. 2013. [http://www.who.int/violence\\_injury\\_prevention/road\\_safety\\_status/2013/country\\_profiles/united\\_republic\\_of\\_tanzania.pdf?ua=1](http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/united_republic_of_tanzania.pdf?ua=1). Last accessed 12 April 2018.
13. Lubega, Nakaanji, Nansubuga *et al.* Risk Denial and Socio-Economic Factors Related to High HIV Transmission in a Fishing Community in Rakai, Uganda: A Qualitative Study. *PLoS One.* 2015;10(8):e0132740.
14. Gosoni, Msengwa, Lengeler *et al.* Spatially Explicit Burden Estimates of Malaria in Tanzania: Bayesian Geostatistical Modeling of the Malaria Indicator Survey Data. *PLoS One.* 2012;7(5):e23966.
15. Siza, Kaatano, Chai *et al.* Prevalence of Schistosomes and Soil-Transmitted Helminths among Schoolchildren in Lake Victoria Basin, Tanzania. *Korean J Parasitol.* 2015;53(5):515-524.
16. Mazigo, Nuwaha, Kinung'hi *et al.* Epidemiology and control of human schistosomiasis in Tanzania. *Parasit Vectors.* 2012;5:274.
17. Asiki, Mpendo, Abaasa *et al.* HIV and syphilis prevalence and associated risk factors among fishing communities of Lake Victoria, Uganda. *Sex Transm Infect.* 2011;87(6):511-5.
18. Estimating the global economic cost of drowning. RNLI. Research Project ID: 15-21. *Frontiers Economics.* 2015. [file:///C:/Users/Pua/Downloads/15452-cost-of-drowning-report%20\(1\).pdf](file:///C:/Users/Pua/Downloads/15452-cost-of-drowning-report%20(1).pdf). Last accessed 12 April 2018.

## APPENDICES

### Appendix 1: Study protocol

### Appendix 2: Study leaflet

Study leaflet in English

Study leaflet in Swahili

### Appendix 3: Information and consent forms

Information and consent forms in English

*Information and consent form A: Surveys*

*Information and consent form B: IDIs*

*Information and consent form C: FGD*

Information and consent forms in Swahili

*Information and consent form A: Surveys*

*Information and consent form B: IDIs*

*Information and consent form C: FGD*

### Appendix 4: Quantitative data collection tools

Death review proforma

Questionnaire A: Fishermen survey

Questionnaire B: Community member survey

Questionnaire C: Drowning death survey

Boat observation chart

### Appendix 5: Qualitative data collection tools

Tools for IDIs

*IDI 1: Risk factors for drowning*

*IDI 2: Health-related risk-taking behaviours*

*IDI 3: Social and economic impact of drowning*

Tools for FGDs

*FGD 1: Risk factors for drowning*

*FGD 2: Health-related risk-taking behaviours*

*FGD 3: Potential drowning interventions*