Factors concerning the effective use of life saving equipment in Uganda and low-middle income countries.

Author

Robert Mills

Masters by Research (MRes) awarded by Bournemouth University August 2021

Robert Mills - Factors concerning the effective use of life saving equipment in Uganda and low-middle income countries.

Abstract

The principle aim of this research project is to establish the factors associated with drowning and life jacket use amongst the fishing communities of Lake Victoria, and the possibility of reducing drowning events using design and innovation. Research is focused on: life jackets, risk, beliefs, culture, legislation, and education. A pragmatic approach using quantitative and qualitative research methods was used to establish the reasoning for non-life jacket usage and identify the priorities for an appropriate alternative life jacket design. Although it is not fully understood if a change in life jacket design would answer the problem of suitability or more importantly, desirability. A comprehensive literature review was undertaken using cited journals, books, conference papers, and trustworthy media reports. Grounded theory was used to compare, and contrast similarities between collected data. Because of the nature of the research problem a qualitative and quantitative mixed methods approach was used to answer the research question. *Why are there so many drowning fatalities in low middle income countries in particular the African waters of Lake Victoria, and what can be done to alleviate the problem?* Sampling techniques involving semi-structured interviews was carried out using experienced sailors/boat handlers. Data was accumulated from their views and opinions on their sailing experiences, foreign waters and health and safety at sea. Planning, analysing, and evaluating data from semi-structured interviews combined with a fundamental literature review produced valuable research data. Data obtained from the interviews was analysed using the mixed methods approach. Interviewees were not unanimous in their views and opinions. Research revealed that Ugandan culture beliefs, perception of risk, lack of appropriate education, alcohol and practicability were the main contributing factors in the non-use of life jackets. Research also indicated that to reduce significant numbers of drowning fatalities would require the mandatory wearing of life jackets. Although this would require the supply and distribution of free or subsidised life jackets, manufactured to an acceptable standard of quality and suitability.

Contents **Page**

List of Figures

Glossary

FAA	Federal Aviation Administration (US government transportation agency)
HIC	High Income County
ISO	International Organization for Standardization
LMIC	Low Middle Income Countries
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MMO	Marine Management Organisation
NFFO	National Federation of Fishermen's Organisations
NGO	Non-Governmental Organization
PFA	Personal Flotation Aid
RLSS	Royal Life Saving Society
SFF	Scottish Fishermen's Federation
WHO	World Health Organization

Acknowledgements

I would like to thank Bournemouth University supervisors, Dr Ben Thomas and Professor Philip Sewell for their guidance, and support. Secondly, I would like to thank members of the BBC Yacht Club, the National Grid Sailing Association, and Shadowfax Racing Charity for their help. I would also like to thank Bournemouth University for the scholarship of which I am truly thankful for. Finally I would like to give a very special thanks to my wife, family, and friends who without their encouragement and understanding the outcome of this thesis would have been very different.

1.0 Introduction

Lake Victoria in Uganda has one of the highest rates of fatalities through drowning of any Low Middle Income Country (LMIC) in the world, as reported by the World Health Organisation (WHO 2018). The reasons why so many people drown every year are unclear. This report intends to focus on problems associated with fishermen and drowning, using a combination of literature review, methodology, and analysis to arrive at a possible solution.

(Fig. 1) Fishermen of Lake Victoria (Daily Mail 2018)

1.1 Identifying Research Problem.

As part of a Bournemouth University (BU) group project module (MSc Product Design 2018) our brief was to design a *simple and sustainable buoyancy product for use by low resource communities with access to basic materials and tools.* Drowning statistics for Lake Victoria was a major part of the brief as discussed in the meeting lead by the RNLI international representative and BU tutor J Powell (Nov 28th, 2018). The discussion focussed on fishermen and water passengers on Lake Victoria having a very high drowning rate, and what if anything could be done to alleviate the problem. It was only when research into drowning intensified that the full extent of the problem unfolded. However the group failed to come up

with a practical life jacket/buoyancy aid recommendation that could realistically save lives in the scope of the assessment.

Information gained from the group project, combined with the researcher's sea rescue experiences and past research findings (Mills 2020) compelled the researcher to find out more about the drowning problem in Uganda and look for a realistic solution. The whole context of drowning needs to be addressed not just each individual drowning event. Each drowning event is based on circumstances leading up to that event. Some are predictable, but the majority were based on an 'element of risk' when travelling/working on or near a substantial body of water.

1.2 Research Project.

Lake Victoria was selected for research due to the estimation by WHO (2018) that drowning mortality rates in central South Africa are some of the highest in the world. Lake Victoria in Uganda is the largest body of water in that area with an excessive drowning rate that needs investigating. The intention of this project is to examine the reasons why Lake Victoria has consistently high rates of drowning fatalities and if research involving life jacket design, innovation, and usability has the ability to reduce those fatalities. Finding out the reasons why a country as large as Uganda has such a high rate of drowning fatalities was the primary concern. The purpose is to concentrate on investigating factors associated with drownings of Ugandan fisherman, taking into consideration, demographics, cultural, social, historical, political, educational, personal, local, regional, and concerns of national significance.

1.3 Research Scope and Boundaries

Researching the subject of drowning, reasons and solutions is a very large undertaking. The aim therefore was to narrow the scope size, focus towards attaining a realistic research question or hypothesis and formulate a theory to generate better ideas. Wight (2004 p13) proposed that "out of the mass of available data the researcher has to select the most important factors and theory guides this process." Research included questions as to why Lake Victoria in Uganda has high numbers of drowning fatalities amongst fishermen,

understanding the reasons why life jackets (if available) are not worn, and if through recommendation's, there is an alternative strategy that will encourage the wearing of life jackets or floatation aids that has the ability to reduce drowning fatalities. Research was conducted within the parameters defining the scope of research methodology. Drownings within Lake Victoria's fishing communities, user behaviour and life jackets formed the predominant boundary for this research. Research focused on the Ugandan side of Lake Victoria. Tanzania, and Kenya were occasionally mentioned as each country borders are within Lake Victoria.

1.4 Research Aims and Objectives.

The research aim is to identify, define and produce a critical analysis of the perspective factors that governs the non-wearing of life jackets or personal flotation aids (PFA), and to change people's perspective on the importance of wearing a life jacket. Research also includes:

- Identifying user needs
- Reluctance to wearing life jackets
- Proving that wearing a life jacket could be the solution to drowning

Research involves a literature review and a methodological approach to collect and analyse data for evidence to substantiate the possibility of a solution.

A well-known phrase from the fifteenth century is "a drowning man would clutch a straw." This phrase was first used by; Thomas More in *A dialogue of Comfort Against Tribulation* (1534). A man in a desperate situation will do anything to save himself, even clutching a straw to keep himself afloat. Anything that will improve a difficult or even desperate situation to stay alive. The intention of the researcher is to investigate the reasoning for not wearing a life jacket and research the possibility of a possible alternative type of life jacket/PFA that will appeal to all those that are in need of a better solution than a straw. A substantial literature review will be conducted followed by a methodological procedure of research based on grounded theory and analysis of data.

2.0 Literature Review

As part of the project research process a review of relevant literature was required. The literature review included reviewing various sources of information from: cited literature, recent journals, books, conference papers, Non-Governmental Organisation (NGO's), and government documents. Only reliable, accurate material relevant to the project was included in this research. Sourcing relevant literature involved the use of Bournemouth University (BU) on-line library facilities and internet search engine Google Scholar. Postgraduate open access research papers were examined for guidance on formatting and presentation. These were found on the BU library BURO service. Topics for review included Lake Victoria, Uganda, statistics, drowning, safety, risk, psychology, education, superstition, legislation, water quality, life jackets, and culture.

2.1 Drowning and Ugandan Fishermen

Drowning prevention among the fishermen of Uganda is a complex issue to investigate as Atukunda and Ahmed (2012 p8) reported "the population of Uganda consist of more than 30 ethnic tribes" and each tribe with their own diverse language and different socio-culture. Community knowledge, attitudes and education towards water safety needs to be addressed along with the necessitated use of life jackets. Leavy *et al* (2015 p3) calls attention to compounding factors that contributes to drowning events including "lack of swimming skills, illiteracy, and unsafe watercraft" and drowning reduction strategies should take into consideration "multiple risks, social and environmental factors". Leavy *et al* also advocates "public health interventions that are well designed and delivered, underpinned by theory, and supported by robust evaluation are more likely to result in sustained, long term behavioural change." Trying to change cultural beliefs and a community's way of life that has been in existence for hundreds, if not thousands, of years seems at first glance of the data implausible, but not impossible.

Lake Victoria (Victoria Nyanza) is the largest freshwater Lake in Africa; it is the second largest freshwater lake in the world (Lake Superior in North America being the largest). Lake Victoria has a surface area of 70,000 km^2 (27,000 sq. miles) is oval in shape and is approximately the size of Ireland. The average depth is 40m with a maximum depth of 82m

(Encyclopaedia Britannica, 2021). Lake Victoria is unusual Brott (2006) as quoted by Makalle *et al* (2008 p309) in that it is often regarded as something of a paradox; "it is a sea of problems, and an ocean of opportunities".

(Fig. 2) Map of Lake Victoria (Britannica.com 2021)

2.2 Drowning Statistics

The World Health Organisation identified in various reports (WHO 2014 - 2019) that central and southern Africa has the highest age standardized drowning death rate per 100,000 population of all the world's regions. Drowning is the third leading cause of accidental death worldwide, accounting for approximately 7% of all injury related fatalities. Africa had an estimated 73,630 drowning deaths in 2016, that accounted for roughly 23% of all the reported drownings worldwide. Fishermen aged 18-40 years account for 80% of drowning fatalities, with most fatalities occurring at night. Globally, around 320,000 lives are lost each year with at least 90% of drownings occurring in Low Middle Income Countries (LMICs). Bierens *et al* (2016 p147) reported that "the true figure could be four or five times larger than that amount". A comprehensive study by Kobusingye *et al* (2017) reported that "transportation accounted for 51.8% of drowning events and fishing 39.0%".

All these figures are difficult to verify due to the lack of official confirmation on the number of confirmed drownings each year. A recent observational study by Whitworth *et al* (2019 p2) on Ugandan fisherman estimated the drowning fatality rate could be as much as 502/100,000 person-years. Compared to statistical data reported by the Lake Victoria

Commission, they estimate that "5,000 people drown below its waters each year." This estimate is more realistic and compatible with the Red Cross statistical figures of 5,000 per year (Mulligan BBC news 4th June 2018).

Kobusingye *et al* (2002 p133) stated that during the period of 1997 – 1999' there were "no recorded drownings in the trauma registries in the five largest hospitals in Uganda: Mulago, Nsambya, Rubaga, Mengo, and Kibuli". The reporting of deaths through drowning can be unreliable if the hospitals and mortuaries concerned do not keep accurate records. Whitworth *et al* (2019 p1) identified "a lack of available comprehensive death records means that under-reporting of deaths cannot be ruled out, as the deceased are seldom taken to hospitals, and facilities enabling post-mortem are limited." Research by Bierens *et al* (2016 p147) reported that "drownings that are the result of floods, or accidents involving ferries or boats carrying refugees are not reported in standard drowning statistics." Carel Van Dorp (2006 *foreword*) suggests that, during the early ages "death by drowning, like so many other causes, was accepted as part of life. Water brings life, water takes life; burial follows." Changing attitudes and a respect for life has finally changed that conception in High Income Countries (HICs), but maybe not so much in LMICs.

Whitworth *et al* (2019 p) carried out a mixed-methods study on the Tanzania shores of Lake Victoria concluding that most adults (84%) were fishing from a boat when they drowned. The report compares the estimated mortality rate of Tanzanian lakeside fishing communities which exceeds mortality rates of malaria, tuberculosis, and HIV collectively. The report concluded that "fishermen who spend significant time on large water bodies are likely to be a high-risk group, particularly in LMICs where boating and life-saving infrastructure may be sub-standard, and safe boating practices insufficiently enforced" (Whitworth *et al* 2019 p3).

2.3 Cultural Aspects

A report by Hattem (2017 p2) *a freelance journalist based in Uganda*, suggests that "Africans have long viewed lakes and rivers as dangerous areas that flood during heavy seasonal rains, are home to crocodiles, malaria-infested mosquitoes, and other dangers." Hattem commented on a report by Kobusingye *et al* (2016 pp 363-370), an epidemiologist at

Makerere University who studied the impact of drowning on fishing communities around Lake Victoria who argues that Ugandans really do not like the water. “When you live close to water, you don’t teach your child how to survive the water; you teach your child how to stay away from the water, that means they are not going to swim.” What few swimming pools there are in Uganda are too expensive for many Ugandans living in poverty. Hattem’s article also describes Ugandan attitudes towards fatalism. Their belief that all events are predetermined, therefor the risk of catching malaria, HIV or drowning is going to happen, therefore it is inevitable. That would suggest why “rates of HIV are three or four times higher than the rest of Africa” (Opio *et al* 2013 p2). When it comes to convincing fishermen to wear life jackets, scepticism and superstition from local people can be a deciding factor of non-use. Many people who rely on fishing for their livelihood are afraid of Lake Victoria. They believe that the god Mukassa (*Mukasa*) rules over the water, wind, and weather, and has a very violent temper. Mukassa is recognised as the guardian of Lake Victoria (Parrinder 1967). It could be that Ugandan fisherman have what is known as Optimism Bias, a mistaken belief that the likelihood of them experiencing negative events (drowning) is lower and the probability of them experiencing positive events are higher than those of their peers - *I have never fallen in, so I do not expect to fall in now*. Being too optimistic can lead to impracticality, complacency, and overconfidence. Bracha & Brown (2011 p68) describes optimism bias as “decision making under uncertainty where objective probabilities of future outcomes are unknown to the decision maker.” If you think negative thoughts about what could go wrong, you would be unlikely to prevent it from happening. Whereas mental strength stems from a good balance of realism and optimism.

2.3.1 Fishermen and Risk

Fishing is well known throughout the world as a dangerous profession and **s**ustaining a thriving fish trade is dependent on taking high risks. Kwiringira *et al* (2019 p1) noted that fishermen’s attitudes and perception of risk is “determined by the socio-cultural relationships within the fishing community, especially that fishing is a sub-culture of risk-takers.” Kwiringira *et al* (2019 p5) identifies that Ugandan fisherman are used to taking risks every time they go fishing, especially when they come across various life-threatening and traumatizing situations. Situations range from intense weather conditions, recovering dead bodies of fishermen, surviving boat capsizes, freezing cold at night in the pitch darkness, and

other similar situations. The main concern of fishermen is “not about the number of fish they catch but survival on the lake”. There is a strong possibility that socio-economic variables can influence factors of risk taking. Research by Irwin *et al* (2011 p570), found that “African American adolescent males adopt a ‘tough guy’ attitude in order to avoid depression and anxiety that typically emerges when living in a dangerous environment.” Holding back fear and exhibiting bravado to impress friends and colleagues may result in poor decision making. Fisherman in the risk-seeking category may have high self-esteem regarding their skills and abilities.

There are too many variables to suggest that any single factor is the cause of so many fatalities. Variables include skipper competence, and crew skills, weather, type of boat, lake conditions, local knowledge, demand, market conditions, and competition from competitors. A survey carried out by Eggert and Martinsson (2004 p7) indicated that “risk aversion is not an important influence when choosing a location to fish” as different areas of Lake Victoria offer increased profitability. The priority is to choose a strategy that generates the highest average profit, location being only part of that strategy. Risk preferences influences behavioural motivation although some fishermen appear to be risk-averse to potential dangers.

Investigations by Eggert & Lokina (2007 p 54) suggest that it could be that different skippers have different priorities when it comes to risk. Skippers range from those that own their own boat, to those who are hired by the boat owner, and those that skipper the boat with the owner on board. If a boat owner is on board, they are more likely to be more careful when it comes to protecting their asset and display risk aversion. Although reports indicate that artisanal fishermen are risk adverse to a lesser extent than what is indicated from evidence of risk aversion in low income environments (Dillon and Scandizzo 1978 p425).

(Fig. 3) Night Fishing Lake Victoria (NYT.com images 2021)

Fishing at night is popular if trying to catch Dagaa (*Omena*), a small silver fish that is caught more than any other fish in Lake Victoria. Dagaa are fished during moonless nights using pressure lamps to attract the fish (Eggert & Lokina 2007 p52). The dangers of fishing on a boat at night especially a moonless night increase the risk factor significantly, especially if the consumption of alcohol is involved.

There are psychological reasons why Ugandan fishermen drown and why they think they are not going to drown. The problem although worse in LMICs, is a worldwide problem. It is probable that the attitudes of Lake Victoria fisherman influence their risk-taking in their pursuit of catching enough fish to feed themselves and their family. Although attitudes help protect fishermen (and us) from admitting personal deficiencies they can also be seen as beneficial to a cause. Attitude helps us to react to events, make decisions and make meaningful sense of relationships with people we come into contact with (Hogg and Vaughan 1995). Research by Gross (2014 p 367) established that "attitudes save us energy, since we don't have to work out how we feel about objects or events each time we come into contact with them."

Smith & Wilen (2005 p 54) indicated that "decisions about deciding to fish, where to fish, how long to fish, and avoidance of adverse weather conditions are intricately related and lead to differing exposures to financial and physical risks." Although this article is based on

Californian dive fishermen, risk and LMIC fisherman is essentially similar when it comes to financial and economic aspects of fishing and risk taking. An understanding by Smith & Wilen (2005 p55) established that the presumption that "fishermen are risk-loving by their participation in a hazardous profession oversimplifies the economic environment in which fishermen operate." Smith & Wilen's article concluded that "behavioural responses to physical risk, and other aspects of the economic environment are heterogeneous." Risk creates a biological response like an adrenaline rush which also creates a sense of achievement. Risk-seekers like the variation that risk brings coupled with the chance of getting a good catch - making the risk worthwhile.

2.4 Drowning and Alcohol

In many countries, "alcohol is one of the most frequently reported contributory factors associated with drownings" (Mittlestaedt *et al* 2000 p2). "Most drowning deaths occurred during recreational periods, over weekends and in the afternoon. Of adult drowning victims, 41.5% were alcohol-positive at the time of death" (Donson 2011). According to a report by the WHO (2018) Africa bears the heaviest global burden of disease and injury attributed to harmful alcohol use. Research by Driscoll *et al* (2004 p111) found that "alcohol effects the central nervous system and cognitive processes." Consumption of alcohol can cause a person to become unsteady and increases the possibility of falling over-board. Alcohol also affects a person's ability to swim thus reducing that person's chance of survival.

In 'The Epidemiology of Drowning' (Branche & Beeck 2006 p61) as reported by Peden (2000) it was noted that: "South African surveillance system, where blood alcohol concentration levels are routinely checked for medical and legal purposes, almost 50% of drowning fatalities proved positive for alcohol, with almost one quarter exceeding 0.20 g/dl at the time of drowning." This would suggest that alcohol intoxication was a major contributor to drownings, along with the overloading of vessels, and unexpected violent weather events. Even though data on drowning and alcohol consumption is limited due to insufficient reporting by the authorities, the data supplied does seem credible when compared with similar reports on alcohol and downing.

A qualitative study by Breuer *et al* (2019) reported that there are various underlying reasons why there is excessive alcohol consumption amongst Ugandan fishermen. Breuer's report concentrates on the social, ecological, and economic aspects of alcohol consumption and the effects of those dependant on fishing for a living. In reports by Breuer *et al* (2019) and the WHO (2018) Uganda is estimated to have one of the highest national alcohol consumption rates in sub-Sahara Africa. In the year 2016 it was estimated that male drinkers consumed 33 litres of alcohol per capita. Obtaining relatively cheap alcohol is possible with locally made brews. A traditional alcoholic drink popular with Ugandans is made from *tonto* (*mwenge*), or *ajon* (*malwa*) brewed from finger millet (Myadze & Rwomire 2014). As reported by Breuer *et al* (2019 p659) it is common with Ugandan young men that they feel they "needed to drink with their friends in order to fit in" and to "avoid public shame for not drinking, (it was socially expected that men drink), and feel included socially." The culture of drinking is fuelled by alcohol availability sold on the streets, in stores, and in bars. National legislation designed to restrict excessive drinking is not actively enforced.

2.5 Reluctance in Wearing Life Jackets.

Research by Quistberg *et al* (2014 p276) found that "boating risk is inherently unpredictable therefore interventions should focus on strategies for increasing consistent use of life jackets." Behavioural factors of Ugandan fisherman and ferry operators to supply and advocate the wearing of life jackets as a matter of common sense is not enforced. Hattem (2017 p1) proposed the view that "Ugandan fishermen were distrustful of life jackets." Some fishermen regard the ones they own as 'fake' and 'cheap' and they would not help if their boat capsized. Good life jackets are considered too expensive to purchase. Those fishermen that can afford good ones complain that because they are uncomfortable, they do not wear them (Whitworth *et al* 2019 p7). Unfortunately, unpredictable accidents do happen hence why so many people drown each year. Therefore, trying to educate all those involved in the use of water transport, and in the use of safety equipment would be a difficult undertaking.

(Fig 4) Pair fishing Lake Victoria (Googleusercontent.com 2021)

2.5.1 Educating Non-swimmers.

The non-use of life jackets, even when they are made available, is a 'significant contributory factor in all cases of drowning with most drownings occurring to non-swimmers' (Mittlestaedt et al 2000 p2). An inability to swim could also be a contributing factor to the high rates of drowning fatalities, especially in Africa where a high number of waters related incidents occur in children aged 1-4 years Miller *et al* (2019). Learning to swim at an early age could also prove beneficial later in life. Ross *et al* (2014 p227) explains that "parents and caregivers who did not encourage or actually discourage swim participation often shared that they were fearful of water. Adults seemed to pass their fear of water on to their children." It is a legacy of fear that has prohibited children from learning how to swim. It would seem that adults have passed on this legacy to children for generations.

Another possible reason why the majority of Ugandans cannot swim, is that the waters of Lake Victoria are of poor water quality and poses a health risk due to the presence of contaminants and disease. Ball (1999 p316) reports that "eighty per cent of all diseases and one third of the deaths in developing countries are the result of contaminated water." Infection of human intestinal schistosomiasis is endemic along the shoreline of Lake Victoria with *Schistosoma mansoni* the most "geographically wide-spread of the causative agents".

Mchau *et al* (2019 p826) reported that users of Lake Victoria are susceptible to contracting an illness known as "gastrointestinal illness (GI). Symptoms include vomiting, diarrhoea, throat, and skin irritation." Lake Victoria is also known to have high concentrations of cyanobacteria cells which are beyond the World Health Organisation (WHO) acceptable limits. It is not just swimming lessons that influences children ability to swim, there are other factors involved that could potentially affect high mortality rates of drowning such as: flooding, drug and alcohol use, child access to water, water transport, and male gender. Graham & Mecrow (2013 p167) proposed that trying to teach health and safety to people in LMICs depended on their perception to drowning and risk. There seems to be a "low level of understanding (across the world, not just LMICs) about the dynamics of the aquatic environment." Graham & Mecrow noted that the perception of water users is that they "simply do not consider drowning to be a risk" - a misconception that needs to be addressed if mortality rates are to be reduced. The significance of swimming lessons at an early age as a preventative drowning measure not only logical but fundamental in preserving life.

2.6 Legislation

The Ugandan government has an open-access approach to fishing in that there are no set limits to the number of fish caught or the number of fishermen or boats allowed to fish on Lake Victoria. Although local committees were set up by the government to over-see regulations relating to the size of nets used to catch fish and the size of catches, committees lack the power and commitment to enforce regulations. (Fishery Exports and the Economic Development of LDCs 2017) "Without strict controls more people will take to the water to fish for decreasing fish stocks, thus increasing the number of fatalities through drowning each year" (Daghar 2019 p2).

A comprehensive review by Pitman *et al* (2018 p1) points out that "survivability among UK casualties wearing life jackets was 94%, compared to just 73% of those not wearing a life jacket." The interpretation of evidence was based on reports from the Royal National Lifeboat Institution (RNLI). Critical evaluation of the data concluded with the recommendation that the wearing of life jackets should be mandated, as an increase in the wearing of life jackets could drastically reduce the number of drowning fatalities each year (Pitman et al 2018 p25). A previous review by the Marine Accident Investigation Branch

(MAIB 2016) established that ‘campaigns succeed in changing entrenched behaviours only when backed by mandatory regulations.’ Although each review gave a clear representation of the data, they were limited to fatalities in UK waters only. As reported by the RNLI (2021 p5), the United Nations (UN) has just passed a resolution recognised by all 193 members of the UN, that identifies that drowning is preventable, and that initiating low-cost drowning prevention measures saves lives . Although commitment is voluntary, the resolution seeks to generate greater political awareness towards the prevention of drowning.

Hattem (2017 p4), reported that “to reduce the high numbers of drowning fatalities in Lake Victoria the African Development Bank approved a $25 million loan for the three countries that borders the lake.” The project is part of a £25 million project organised by the Lake Victoria Basin Commission. As reported by Yonazi (2016) the African Development Bank (AfDB) confirmed that the project is designed to take 4 years to complete (2016-2020) with the main bulk of the money going towards improving communications. The intention is to increase mobile phone coverage by 100%. Regular weather reports will be provided, and an alert system will notify people (via text message and radio broadcasts) if adverse weather is predicted. A 911-type phone number to report emergencies to a rescue coordination centre will be created. When using a mobile phone to alert the emergency services, the mobile phone signal will identify where you are and alert the nearest search and rescue centre. It is anticipated that these improvements will reduce the number of drowning fatalities by 80%. If the project gets completed on time and if fishermen embrace the changes, it will make the fishing industry safer, and feasibly a reduction in the number of drowning fatalities.

2.7 Life Jacket Standards

Ever since cork life jackets were designed in 1851 by Capt. John Ross Ward, their design and cost has changed considerably with the advent of new technology and textiles. In a news report by Elgie (2021) on Ugandan fishermen “fishers cannot afford to buy quality lifejackets – those that they can afford, are of poor quality, and many locally manufactured lifejackets are condemned by the Uganda National Bureau of Standards as fake”. In 1963 the British Standard BS3395 was introduced for the general use of life jackets. From July 1995 all life jackets and buoyancy aids had to comply to European Standard ISO

12402. Current regulations relating to life jackets and buoyancy aids only apply to European and Western countries, they do not cover LMICs like Africa.

2.7.1 Life Jacket Design

Personal flotation devices differ in the amount of protection they offer, but the garments main priority is to keep the wearer afloat in water, in a more or less upright position. A life jacket has to appeal to a user, it has to be functional, and also aesthetically pleasing. An uncomfortable life jacket can be irritating to wear especially in hot climates when the user might be wearing a minimum amount of clothing. A well-fitting life jacket that is comfortable gives the wearer a sense of psychological satisfaction, and value for money. Customer satisfaction and value is grounded on "perception of qualities and attributes" (Lonial & Zaim 2000 p554). Tests carried out by McFadden (1978 p26) FAA Civil Aeromedical Institute, reported that the efficiency of a life jacket will be dependent on the type of clothing worn, as air can collect in trousers, pockets etc. effecting the wearer's lower trunk buoyancy and elevation to increase thus affecting stability. Variations in fabric porosity and clothing bulk as well as weight of shoes and additional possessions can have an adverse effect on rotation and self-righting properties. McFadden also noted that "displacement of the life jacket and redistribution of buoyancy may result in cancellation of the effectiveness of self-righting designs."

2.8 Literature Summary

There is sufficient evidence in the literature review to gain an insight into the reasons why so many Ugandans drown each year when fishing on Lake Victoria. Drowning fatalities are not attributed to any particular reason, as there are multiple factors involved. Reports on the amount of people that drown each year are not that accurate due to the lack of official recognition by the local authorities. Statistical data on drownings is based on estimates only. The wearing of life jackets is not considered that important even though most Ugandans cannot swim. Children are not encouraged to swim at an early age hence why so many adults cannot swim. Fisherman's main priority is to catch fish and earn enough money to provide for themselves and their family. Because of that priority fishermen are prepared to take an increasing amount of risk to secure a good catch. Their use of alcohol especially when fishing

at night is a contributing factor in drowning related incidents. Although the Ugandan government talk about regulating fishing, they are limited in their policing abilities. The three main reasons why Ugandan fishermen dislike wearing life jackets are discomfort, cost, and availability.

2.9 Research Question

Why are there so many drowning fatalities in low middle income countries in particular the African waters of Lake Victoria, and what can be done to alleviate the problem? The research questions although narrow and specific in content involved some key concepts that were thought to be relevant, ethical, feasible, and worthy as a research project.

3.0 Methodology

A visit to Uganda to study fishermen at work was put on hold due to government covid-19 restrictions. Despite the setback, a research methodology approach was considered the best course of action to address the research problem (Creswell 2009 p18). Interviewing a sample of willing participants formed a major part of the ethnography study to identify, describe, and interpret cultural behaviour. Portraying and identifying Ugandan culture, formed a significant part of the research strategy, along with a mixed methods approach, which (Gray 2009 p204) described as "the collection or analysis of both quantitative and qualitative data in a single study."

3.1 Research Strategy

The research strategy was based on grounded theory using a step by step plan of action. Conducting research systematically to a scheduled time-line which involved producing quality literature results, qualitative and quantitative data from semi-structured interviews, data from multiple perspectives, and document analysis of value. A research framework was formed using research methods based on principles derived from primary and secondary research techniques.

3.2 Grounded Theory

Grounded theory formed the basis of the project as the "generation of theory is grounded in the data" (Dawson 2012 p19). Grounded theory and data collection techniques are considered appropriate for this type of research project, as it involves the collection, and analysis of qualitative and quantitative data. Analysis of data started as the data was being gathered. Data collection only stopped when the researcher considered that theoretical saturation had been reached. Grounded theory as noted by Davis (2008 p236) is a "non-positivist qualitative research method used as a basis for theory, rather than actually employed as a detailed model of research." Or as Creswell (2009 p13) explains, the "two primary characteristics of design are the constant comparison of data with emerging categories and theoretical sampling of different groups to maximize the similarities and the difference of information."

3.3 Ethnography

The research could only gain a better understanding of the problems involved if he were able to observe, study, and gain an understanding of the mentality and inherent cultural beliefs of those involved. Davis, C, A., (2008) argues that ethnographic research "requires the study of situations that would have occurred without the ethnographer's presence and the adoption of a role in that situation designed to minimise the researchers impact on what occurs." Dawson (2012 p18) claims "the emphasis in ethnography is on describing and interpreting culture behaviour." Ethnography was to be used as part of the primary research plan, which involved travelling to Uganda to study Ugandan fishermen as a cultural group in their natural setting over a lengthy period of approximately 2-3 weeks. The researcher was hoping to become part of the project, but unfortunately covid restrictions changed that plan. As part of the project the researcher could have decided what had true meaning, and to gain an understanding of what is real, and what is false. The researcher wanted to see for himself and experience any problems the fishermen might encounter from the fishermen's perspective.

The participants used in the sampling procedure had limited experience in matters of commercial fishing or the problem associated with using inadequate safety equipment, and limited resources. But they are all experienced sailors who respected the sea, its unpredictability, and inherent danger to life. As Bell (2010 p15) points out, when using a case study approach "if the study is well structured and carried out and makes no claims which cannot be justified, it may well be relatable in a way that will enable members of similar groups to recognise problems and, possibly, to see ways of solving similar problems in their own group." Epistemology research focused on what is "known of the research subject, the nature and source of that knowledge, limitations of knowledge in the field of study and what is identified as true" (Wisker 2008 p123).

3.4 Ethics

The original aim was to visit villages around the perimeter of Lake Victoria and assess the situation first-hand. The on-going global pandemic at the time of writing prohibited that venture in going ahead. The BU ethical checklist was completed along with a participant information sheet, participant agreement form, and a draft copy of the participant questionnaire (Appendices 'A' 'B' 'C' & 'D'). Ethics approval was obtained from the BU ethics committee I.D. No/34479/5th Jan 2021. Ethical constraints, and considerations

involving participant confidentiality is an essential part of the interview procedure. Recording interviews with audio equipment can only be acceptable if participants agree in writing or if using the online tool 'Zoom' then a verbal agreement was acceptable. Part of the participant agreement form informs participant that interviews will be recorded, then transcribed, and the recordings erased. Participants have the option of requesting a copy of their transcript and review the wording before inclusion within the data analysis process. Participant approval forms were acknowledged and approved by all participants before the commencement of interviews. It was essential before the interviews procedure started, that participants were fully informed of the purpose of the research and to know their rights of consent under BUs ethics code of practice.

3.5 Health and Safety

The health and safety of all participants is paramount in any research involving human participation. A risk assessment was discussed with supervisors and deemed unnecessary due to the researcher working from home (covid regulations). The researcher had no physical contact with any of the interview participants or voluntary helpers. No human trials of any new concept designs were planned during the research project.

3.5.1 Quantitative or Qualitative?

Research involved using a mixed method research strategy incorporating various aspects of qualitative and quantitative research to add greater strength to the project. Creswell (2009 p14) reported that "all methods have limitations, as biases inherent in any single method could neutralize or cancel the biases of other methods." The creation of qualitative data required collecting largely unstructured information on beliefs, values, feelings, and emotions (Bond 2004 p23). This was achieved mainly from interviewing people and discussing the research problem during a brain storming session. Qualitative data is not always precise in its content (it depends on the emotional and circumstantial condition of the participant). Data collection had to be carefully managed to achieve a reliable and meaningful outcome. Creswell (2009 p 124) also recommended that interviews can also be used to "explore variables under investigation in greater detail and triangulate findings using quantitative and qualitative data." The researcher used participants observation as a secondary source of data. That data as with all collected data, had to address the research question, otherwise it would

have proven meaningless. To make sense of the analysis, participant data was linked together then integrated within a particular theme. This reduced the possibility that data would be divided if not connected correctly. The themes were based on the research question and addressed the problem of the non-wearing of life jackets. Each theme consisted of questions regarding, the wearing of life jackets, beliefs, legislation and proposals, life jackets and LMICs.

3.5.2 Sampling Procedure

If the UK government had relaxed covid restrictions, then face to face interviews would have been the preferred choice. The use of focus groups for group interaction and discussion was considered, but again government restrictions on the meeting of groups prohibited this form of research. Past experience by the researcher has shown that using a set of semi-structured questions for the face-to-face interviews is quicker and a more reliable process than sending out a modified questionnaire to participants via email or the postal service. The main interviews were conducted one-to-one online either via Zoom or Microsoft Teams.

The questions were grouped according to their relevance. 'Personal information' as warm-up questions. 'Sailing experience' to see if the participant' had the necessary knowledge and skills to answer the questions. 'The wearing of life jackets' to obtain the participants personal views on the subject. 'Beliefs' what they think they know of life jackets. 'Legislation and Proposals' if participants believe that increased legislation would affect drowning statistics. 'Life Jackets and Low Middle Income Countries' this is the main group of qualitative open questions that concentrates on underdeveloped countries (like Uganda).

A draft copy of the questions was checked by two retired schoolteachers to see if the questions where appropriate to the research project. They were asked to critically evaluate each question, suggest alternative questions, or look out for ambiguities and any leading questions. At least three of the questions were not deemed relevant to the research question and after due consideration removed. Changes were made to the preamble wording; *treated in the strictest confidence* and was changed to *remain confidential and in line with the university's ethical guidelines*. That way the participants now gets a written guarantee of ethical protection as stated in the university's code of conduct. The biggest change was the move away from asking direct questions, and instead producing statements that participants

can either agree or disagree with. Altogether eleven alterations were made to the questions. The review was carried out to resolve any problems before interviews commenced. For interview questions see Appendix 'D'.

3.5.3 Piloting the Questionnaire

A final pilot study was conducted to ascertain if the proposed interview questions, grammar, and wording were appropriate for use in this project. Three examiners all with sailing experience were sent copies of the interview questions, along with a participant information and participant agreement form for their views and comments. Although not directly linked to Ugandan travel experiences, each examiner had travelled within different areas of LMICs either through work or vacation, on at least one occasion. Each examiner approved the documents after minor alterations to the grammatical content. The BU ethics committee also approved the final set of questions, and participant information sheets.

3.5.4 Interviews

Prospective participants were contacted by email or phone to see if they were willing to be interviewed. This method of recruitment ensured a reasonably high response rate. Cultural differences, gender and class background had to be taken into consideration to avoid cultural sensitivity, awkwardness, or embarrassment of participants (Wisker 2008 p193). Due consideration was given to posting or e-mailing questionnaires to prospective participants. The main concern was that participants might not be willing to spend the time filling the questionnaire in. Even if the questionnaire was impressive in its content with an eye-catching title does not mean they will take the time to fill it in or even send it back.

3.5.5 Demographics

Demographic information of participants included: a total of 12 participants, 6 male and 6 females. Ages ranged from 32 to 72 years. Education included 6 postgraduates, 2 of them PhD's. Sailing experience included:

- 2 x Commercial Endorsed Yacht Masters
- 2 x Ex Commodores, Yacht Masters

- 2 x Costal skippers
- 3 x Day skippers
- 1 x Bosun's mate (*Lord Nelson* Sail training vessel)
- 2 x Experienced cruising/racing crew
- 1 x Deep water Ocean sailor (BT challenge event)

Participant criteria included a firm understanding of the research problem, extensive sailing/boating experience, academic abilities, and willingness to take part. The researcher has through his association with sailing clubs, sailing charities and private yacht charters accumulated a large selection of friends regarded as potential participants. The interviewer new the participants personally due to the nature of the research subject. There was no conflict of interest with any of the participants, they all remained impartial throughout the interview process. They were selected for their experience in understanding potential problems associated with boats, and drownings. They had all undertaken various Royal Yachting Association (RYA) courses ranging from Competent crew to Yacht Master and Sailing Instructors. None of the participants had been interviewed by the researcher before. Once the interviews had been recorded, each participant recording was coded, and transcribed, before deleting the recordings. Data Analysis depended on the quantity and quality of collected data. Display formats are included in the analysis to add embodiment and clarity. Requiring a gatekeeper was a consideration for the interview process, but as the participants were interviewed separately and were not part of a vulnerable group a gatekeeper was not required. During the interview process, a saturation of knowledge was reached, and no more participants took part in the interview procedure.

4.0 Results Section

Before interviews started the interviewer read a short preamble briefly describing the research subject, the type of questions opened or closed, anticipated time to complete, recordings, and confidentiality. Participants were allowed considerable freedom in answering the questions, as the interview questions were designed with the possibility of prompting multiple responses. Participants were asked to give their quantitative responses from a set of possible answers via a Likert scale of; strongly agree. agree, neutral, disagree, strongly disagree. The Likert scale was used to discover "strength of feeling or attitude towards a given statement or series of statements" (Bell 2010 p146). The Semi-structured interviews also contained a

selection of qualitative open and closed questions. The time to complete each interview was dependant on participants attitude towards the questions. The main reason for conducting interviews was to find out participants thoughts and opinions on the theme relating to life jackets, and their use in LMIC. “The task of the interviewer was to direct questions and topics of interest and to avoid unduly influencing a participant’s narrative” (Davis 2008 p107). This was accomplished by adopting a neutral stance and refraining from expressing an opinion or assisting in interpretation.

Likert Scale

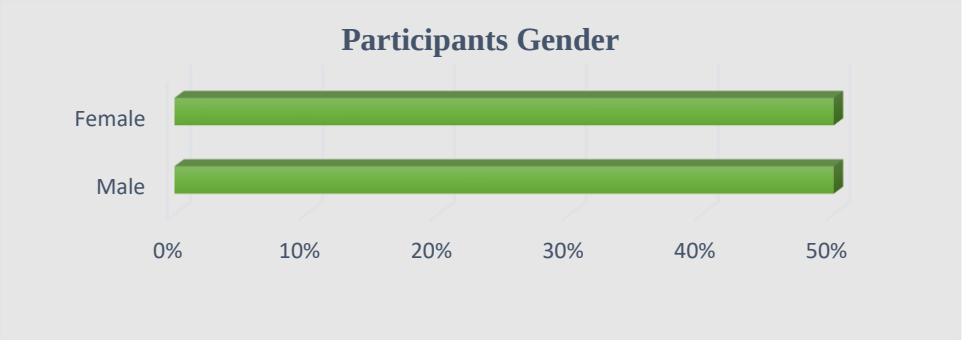
1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

(P) = Participants 1 - 12

4.1 Personal Information

Question 1 *What is your gender? (Male) (Female) (Other)*

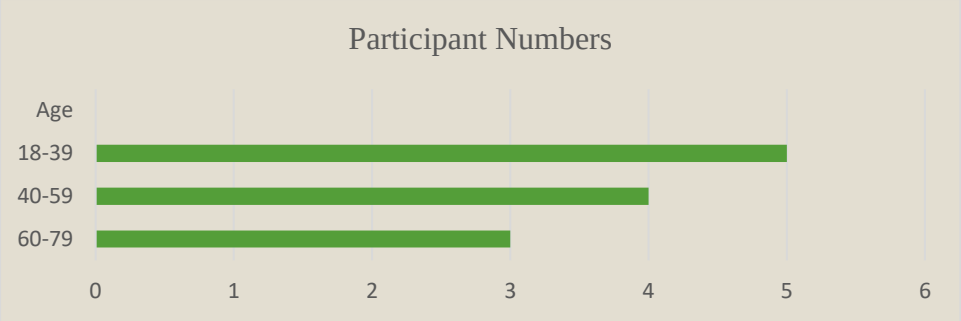
Participants included 6 Male, and 6 Female.



(Fig 9)

Question 2 *What is your age group? (18 – 39) (40 – 59) (60 – 79) (80+)*

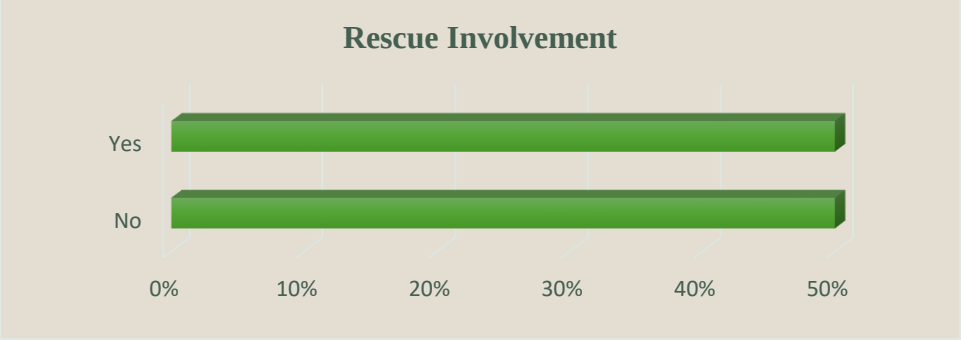
Participant age ranged from 5 x (18 – 39) 4 x (40 – 59) 3 x (60 – 79)



(Fig 10)

Question 3 *Have you ever been involved in a rescue situation?*

6 participants replied No, and 6 participants replied Yes.



(Fig 11)

4.2 Sailing Experience

Question 4 '*How many years boating/sailing experience do you have?'*

The total years of boating/sailing experience of the 12 participants was 245 years. With an average experience of 20.4 years per participant.

Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Years	10	5	63	16	8	10	28	30	40	10	20	5

Question 5 '*What size boats do you generally go on?'*

Average size of boats ranged from small dinghies (3.5m) to larger vessels (13m +).

Question 6 '*Besides UK/European waters, where else have you gone boating/sailing?'*

Responses given: USA, France, Turkey, Australia (East Coast), East Pacific, Mediterranean, North Atlantic Ocean, Caribbean, Artic Circle, Barring Straits, Iceland, Baltic, New Zealand, Galapagos Islands, Morocco, Brazil, and Bermuda.

Question 7 '*On average, how many days a year do you normally go boating/sailing?'*

(Pre-Covid 19) A total of 312 days per year. An average of 26 days, for each participant.

Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Days per year	15	7	50	16	50	18	21	20	40	15	20	40

Question 8 '*Do you normally skipper boats/yachts?'*

Five participants answered = No, three answered = Yes, and four answered = sometimes. Although each participant is qualified up to yacht master standard, not all of them want to be a skipper.

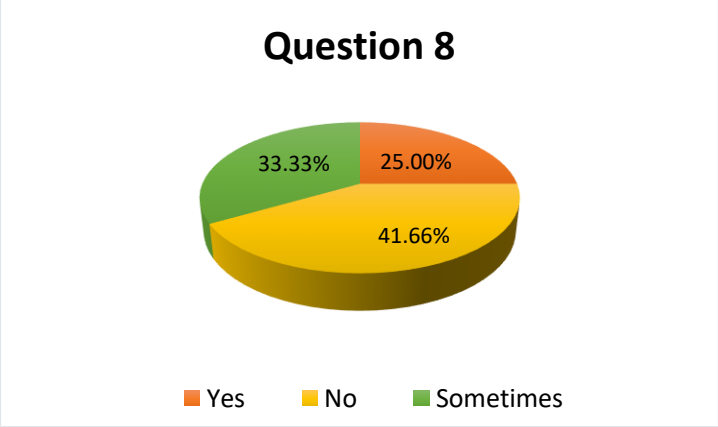


Fig. 12 Quantitative Responses – '*Do you normally skipper boats/yachts?'*

4.3 The Wearing of Life Jackets

Question 9. '*If a life jacket were made available, would you wear one?'*

(P3) answered 'it depends.'

(P4) replied "only if the circumstances dictated or I was asked. They know the risks involved and yet accidents do happen even in calm weather."

(P11) "I would not generally wear one when it's calm."

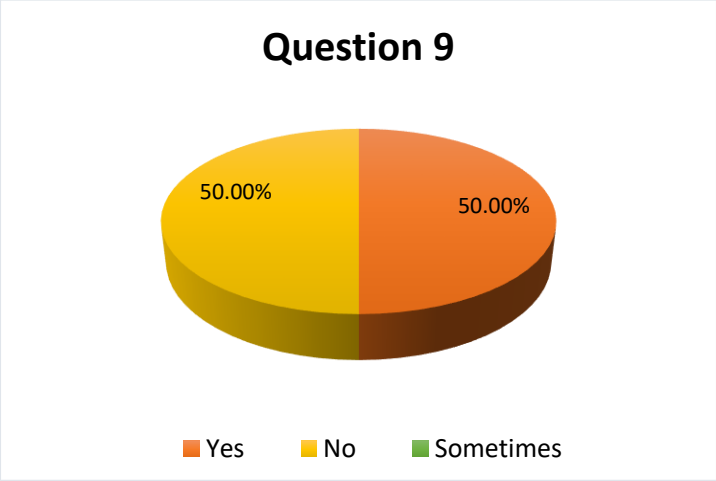


Fig 13 Quantitative Responses – '*If a life jacket were made available, would you wear one?'*

Question 10. '*Would you always encourage crew members to wear a life jacket?'*

(P1) "It all depends on if you are confident in swimming. Being able to swim is not a guaranty of survival. If you have a life jacket on, they would be able to find you easily."

(P3) "There are occasions when I positively encourage the wearing of life jackets, like at night, when it gets lumpy, and in an open sea with large waves. If there are plenty of other boats around, I see no reason what so ever to put life jackets on."

(P4) "If you wish to wear a life jacket you can. But if they fell in, you would wish they had."

It should be as (P5) replied "I feel uncomfortable if there are crew members not wearing them. If I am responsible, I want other crew members to wear them."

(P6) "It's a responsible thing to do. A duty of care for everyone in your charge."

(P7) “At least it would give the skipper a peace of mind…as a precautionary measure I would strongly encourage people to wear them.”

(P8) “As the RNLI said life jackets are useless unless worn.”

(P11) Thought that “if it’s very calm and no one else is wearing one, I tend to go with the flow.”

(P12) responded “I know how hard it is when you have to rescue someone, another good reason to wear a life jacket.”

(P10) “Not knowing the people involved or if they can swim, as a precautionary measure I would suggest wearing them for their own safety and my piece of mind. There are some instances where you are in safe waters, its calm and people are experienced perhaps you judge it to be less risky that life jackets may not be worn.”

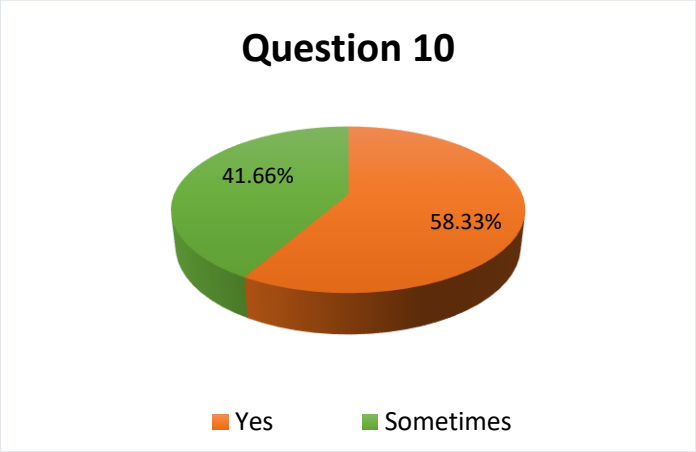


Fig 14 Quantitative Responses – ‘*Would you always encourage crew members to wear a life jacket?’*

Question 11 ‘*Wearing of life jackets should be mandatory?’*

There were mixed answers to this question, but very little in the way of comments. The lack of comments was surprising but not unexpected due to the comments made in Question 10. Although (P10) replied “if it is mandatory all the time then yes, I agree especially if there is common sense involved.”

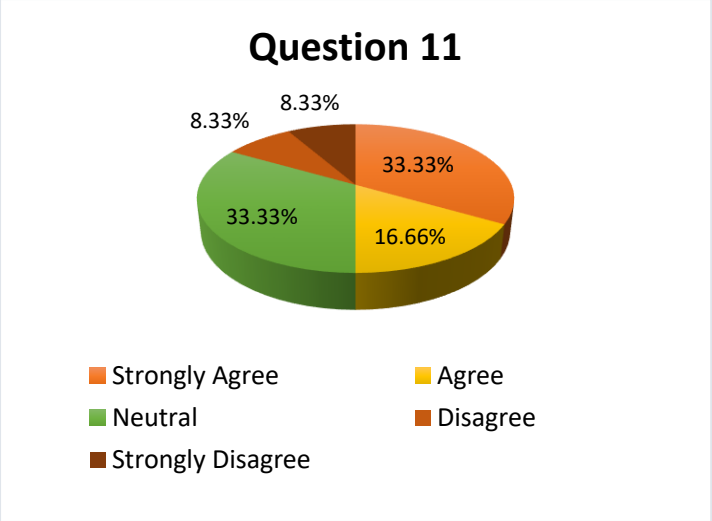


Fig 15 Quantitative Responses – '*Wearing of life jackets should be mandatory?'*

Question 12 '*Buying a life jacket, you would buy the cheapest 'basic' one?'*

(P10) "I would probably get the best I could afford."

(P11) replied "No I would go for quite an expensive one."

(P2) said "I would get one better than basic."

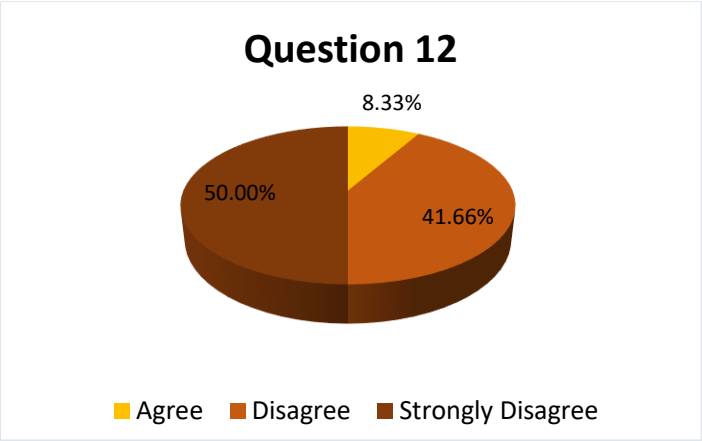


Fig 16 Quantitative Responses – '*Buying a life jacket, you would buy the cheapest 'basic' one?'*

Question 13 *'If money were not an issue, what type of life jacket would you purchase and why?'*

(P1) "One that is easy to use that does not restrict movement."

(P2) "One with rollover protection."

(P3) admitted that more information was required before deciding.

(P4) replied, "I would go for the one most recommended."

(P5) wanted a "strong 'D' ring fitted of the type to enable an attachment to help pull you from the water."

(P6) wanted a "slimmer design, one that is easier and un-restrictive when moving round on deck" and one that was 'light weight and easy to wear and maintain."

(P7). Meanwhile (P8) suggested "one with a built-in harness and is comfortable."

(P9) "I would go for a very well fitting one that uses a Hydrostatic Release Unit (HRU) to go off."

(P10) commented "one that was comfortable, convenient, practical, and needs less servicing. One with fewer moving parts, and one that is more durable."

(P11) "Definitely not the most expensive, but one that has good materials, durable, has a light, and whistle, a good harness, is comfortable, and has good reviews."

(P12) "I want one that can support my weight and build, and one that can support my head effectively. I would buy one that has all the key features."

Question 14 *'If you were offered a manual-inflating life jacket as the only option, would you wear one? Please provide a reason for your response.'*

Participant views included (P1) (P3) (P7) a manually inflated one is better than having no life jacket.

(P2) "You may not get to blow it up properly but at least you have got something."

(P11) "Because it is better than nothing, and if it is the only option, it is definitely better than nothing."

(P12) “I would rather have that than nothing, but a bad life jacket can sometimes be worse than having no life jacket. Some can flip you over, so you are face down.”

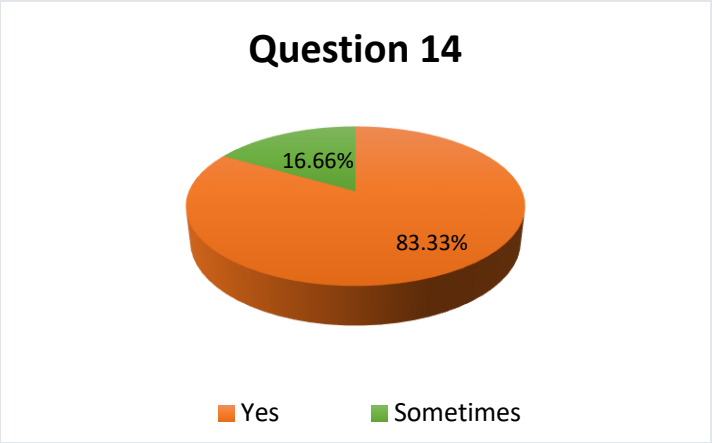


Fig 17 Quantitative Responses - *‘If you were offered a manual-inflating life jacket as the only option, would you wear one? Please provide a reason for your response.’*

4.4 Beliefs

Question 15 *‘Life jacket users are perceived as being novices or non- swimmers.’*

(P4) Strongly disagreed as “a lot of people I see wearing them do a lot of sailing and things, so I don’t think so.”

(P7) thought “I think there is a certain amount in that.”

(P9) Was not sure when answering the question “depends on if you are asking a sailor or non-sailor.”

(P10) “Yes potentially, there could be a cultural stigma attached to them, it could even be unconscious bias or something.”

(P12) responded that “I would see it as being personal choice.”

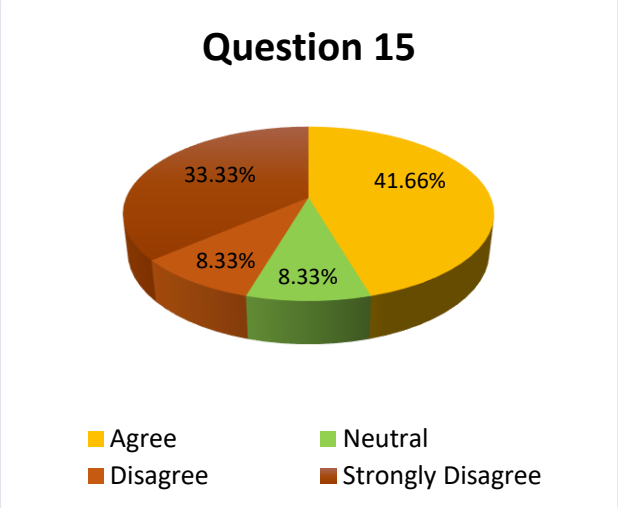


Fig 18 Quantitative Responses – '*Life jacket users are perceived as being novices or non-swimmers'.*

Question 16 '*You think cultural beliefs influence decisions in life jacket use.'*

Participant (P4) was unsure and replied, "I think because I don't know enough about other cultures and what it's like for them, I don't have enough knowledge to be able to say."

Another (P5) agreed but went on to say, "you are more likely to be influenced if you're younger."

(P8) Reflected that "it's more bravado than cultural beliefs."

(P10) Thought that "it's education I guess, it could be part of their culture."

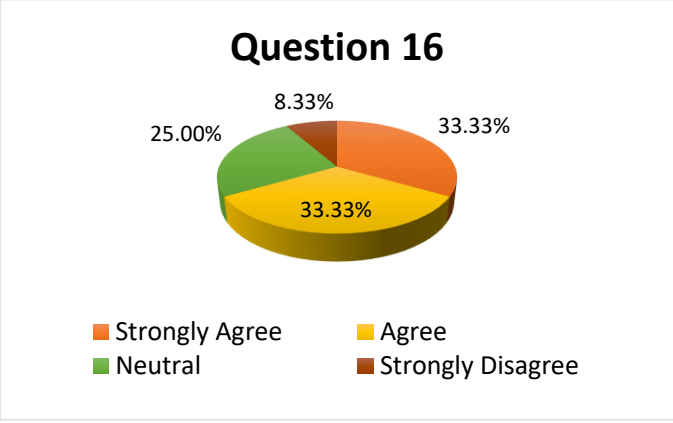


Fig 19 Quantitative Responses – '*You think cultural beliefs influence decisions in life jacket use.'*

Question 17 '*Peer pressure is a deciding factor in non-use.'*

(P3) Thinks "it can be but not always."

(P4) "I think in certain circumstances yes I suppose it could be."

(P9) Responded "it depends on who we are referring to."

(P10) "That would probably be quite true, although I would like to think there is some common sense out there."

(P11) Commented that "I grew up in a country (Italy) that doesn't wear helmets on push bikes, due to peer pressure."

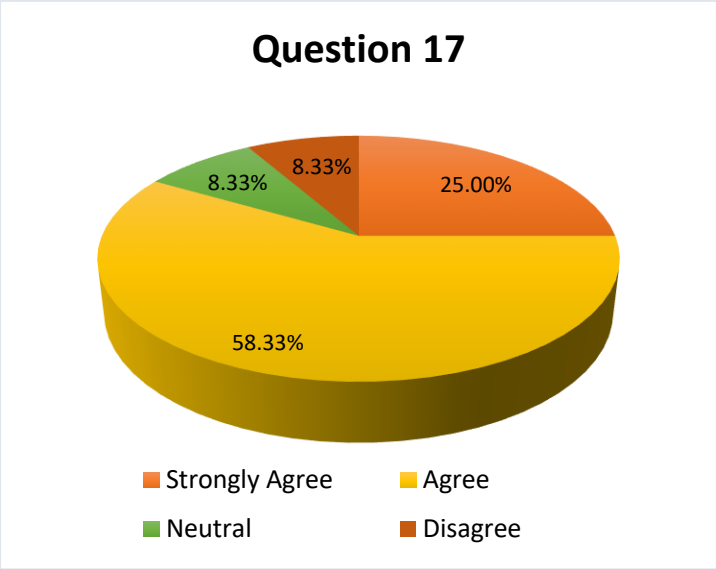


Fig 20 Quantitative Responses – '*Peer pressure is a deciding factor in non-use.*'

Question 18 '*Cheaper 'basic' life jackets might encourage use.'*

(P6) "The more accessible they are, the more chance they have of wearing one."

(P10) "Mortality is quite a big deciding factor, as a whole lot of people are dying out there. Even a rudimentary device that was made available would be beneficial."

(P12) answer although long, was inspiring in its content. "If people see it as a disposable bit of kit of little value, I think it won't encourage people to wear them. But if they see it as of value as a piece of life saving equipment designed to save their life, I think they will value it more."

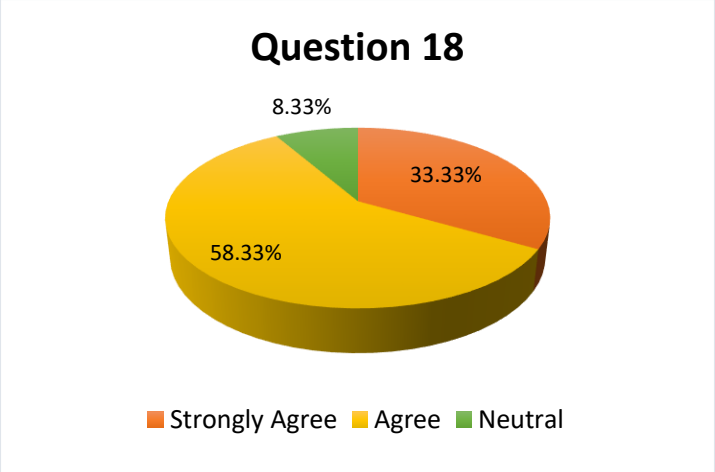


Fig 21 Quantitative Responses – '*Cheaper 'basic' life jackets might encourage use.'*

4.5 Legislation and Proposals

Question 19 '*The consumption of alcohol should be banned on vessels.*'

(P1) Commented that the ban should be "only on commercial vessels."

Whereas (P4) thought that "I would worry that it could impact on others."

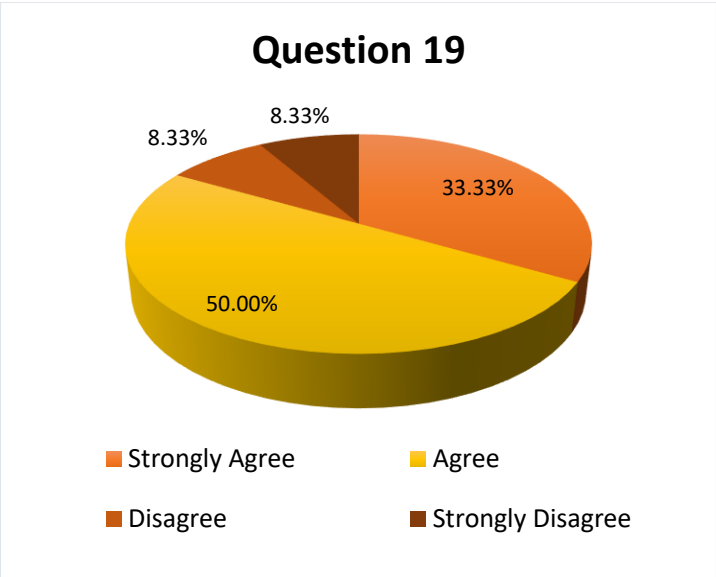


Fig 22 Quantitative Responses – '*The consumption of alcohol should be banned on vessels.'*

Question 20 *'Life jackets should be government subsidised to encourage use'.*

(P4) thinks that "maybe they should so everyone has better access to them."

(P7) "I have seen fishermen there [Africa] they are very poor. For somewhere like that it's absolutely a no brainer."

(P8) "there is so much that the government should spend money on, it is not on their list of priorities."

(P9) "subsidising life jackets make them more available to people."

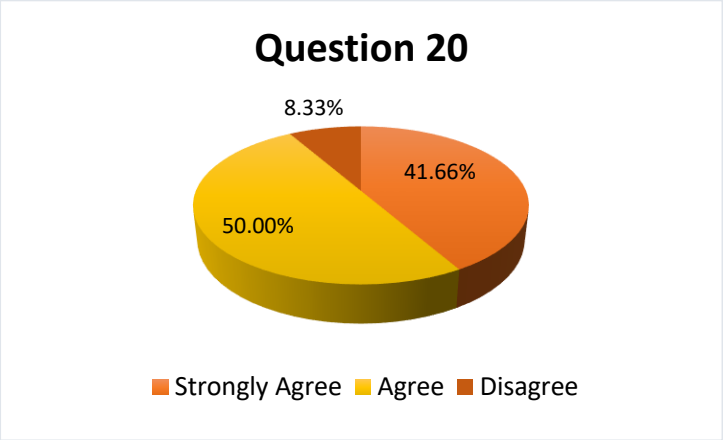


Fig 23 Quantitative Responses – '*Life jackets should be government subsidised to encourage use.'*

Question 21 '*Fishing communities should have a designated safety representative.'*

(P4) "If somebody takes more responsibility then it raises awareness maybe. Having somebody looking after others so it kind of makes sense."

(P5) "If an elder or someone in authority was put in charge or was appointed a safety representative, then people might listen to them more and be influenced by that."

(P8) "If you have got someone who's championing safety, people are more likely to listen to it."

(P10) "Someone to spread the word, to point out if something is purely knackered or not."

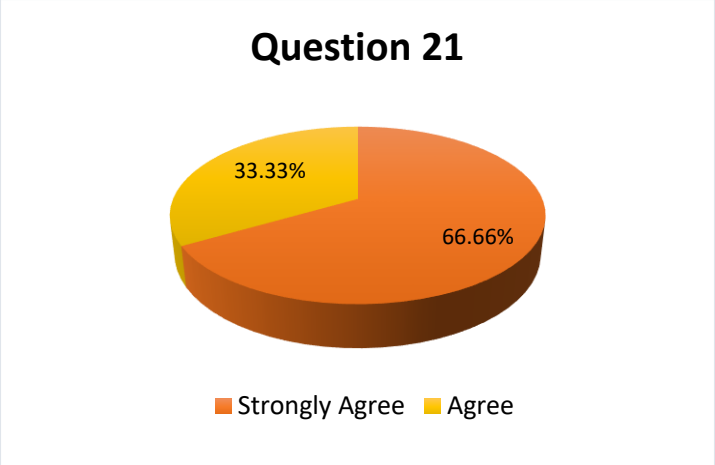


Fig 24 Quantitative Responses – *'Fishing communities should have a designated safety representative.'*

Question 22 **'***All boat operators and skippers should have a licence to operate.'*

(P3) Thinks that "It depends on what you call a licence, a yacht master cert is not a licence".

(4) "Obviously you need to have a certain level of qualification, there are so many people that have no idea what they are doing".

(P5) "It's frightening the fact you can buy a boat with absolutely no idea about tides or anything".

(P7) "It would be a laudable aim if it could be made to work."

(P10) "Anyone can buy or rent a boat then put themselves and crew at risk."

(P11) "Because of the practicalities involved it would be very difficult to police."

(P12) You "should be able to demonstrate that you know how to control it (skiff). If the issuing of licences was at village level, then there would be a certain amount of control."

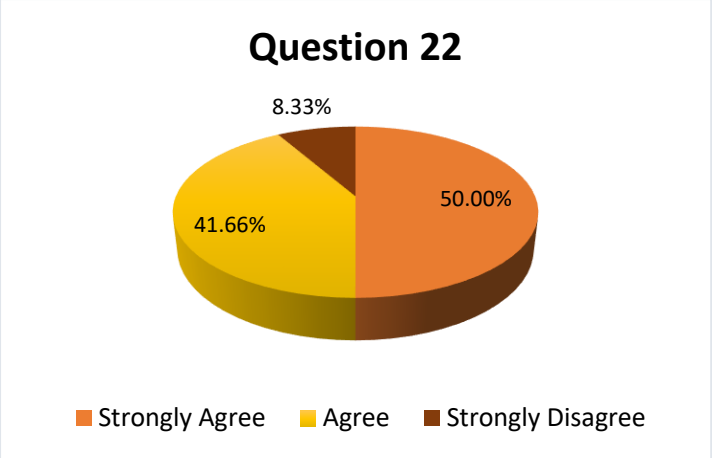


Fig 25 Quantitative Responses – '*All boat operators and skippers should have a licence to operate.'*

Question 23 '*The wearing of life jackets for children should be mandatory.'*

(P3) Agreed that "encourage children to wear life jackets yes, but if you are trying to make it mandatory it all depends on circumstances."

(P12) "If you put them in an ill-fitting jacket, it's worse in some ways."

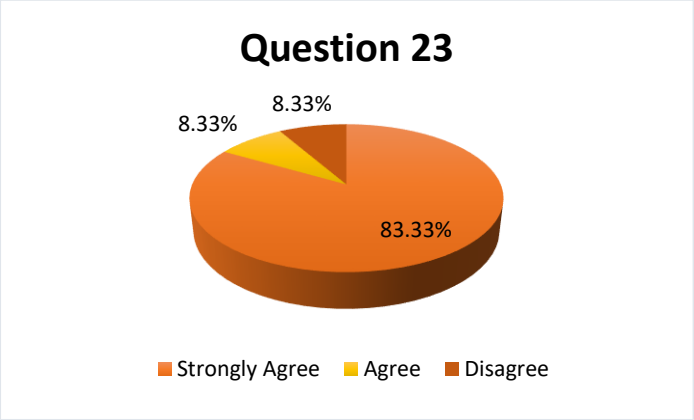


Fig 26 Quantitative Responses – '*The wearing of life jackets for children should be mandatory*.'

4.6 Life Jackets and Low Middle Income Countries (LMICs)

Question 24 '*What do you feel about promoting European-standard life jackets for use in LMICs?'*

(P1) "if you are working and there is an opportunity that you might get knocked overboard you obviously need a better one [life jacket], it is down to the user's own judgement and situation."

(P2) "I think if you went for the European standard straight away you might stop people from having access to life jackets up to that standard."

(P4) Argues that "just because people financially are in a different environment, does not mean their lives are any less valuable… something that is easy to put on and easy to wear is better than nothing for someone who cannot swim. The thing about not being able to swim is you do not know how to float."

(P6) "If there is anything we can do to support LMICs having access to good quality life jackets it should be done. Any form of floatation device if they are going to be on the water is better than having nothing at all."

(P8) Points out that "given that so many people just cannot swim, would it be acceptable for someone to have a lower speck life jacket than we would think that's acceptable to keep someone alive?"

(P9) "They should meet a certain standard but taking into account making them available at a sensible useable cost."

(P11) "I would rather have a buoyancy aid than nothing."

(P12) Thought that it "might be difficult to get parts or people to service them. I am not sure European standards would be appropriate to the same level of security there."

Photographs of different types of life jackets, shown to participants for comparison (See Appendix 'E').

Question 25 '*What do you think about the supplying of passenger aircraft-style life jackets for LMICs?'*

(P1) "As long as they are self-inflating, I think it would be a good idea, they would at least keep you afloat until rescue comes."

(P3) "I see nothing wrong with passing on aircraft style life jackets to someone who can use them. A cheaper life jacket is better than nothing."

(P4) "If there is stuff that is of a better quality available great, but if that what was realistically achievable, and the people were happy to have that then that's fine. But make them aware that probably there is something a bit better out there."

(P6) "If they are cost effective and fit for purpose then yes."

(P8) "They probably need to be adapted to make them more durable."

(P9) "Something like a commercial aircraft life jacket is essential. They are going to be a lot cheaper, easier to produce and distribute. It seems like a very sensible thing to do and put in place."

(P10) "If you had an extra 10 seconds to grab it, I think that would be fine."

(P11) "Actually that is a pretty good idea. Our life jackets are too clumsy with all that stuff inside."

Question 26 '*What do you think about relaxing life jacket standards to make them more accessible to LMICs?*'

(P1) Points out "you could relax standards if quality control meant that the thing [life jacket] has been tested and proved to be functional."

(P2) "If they wanted to wear something they would regardless. As a safeguard you might want a minimum manufacturing standard."

(P5) " Standards could be relaxed in those countries depending on their circumstances."

(P6) "There should be a minimum standard. If anything, that can be done to reduce bureaucracy that must be a good thing."

(P7) "As long as they work, and they were reliable."

(P10) “If it stayed inflated for a couple of days to be able to get you back to shore it would be encouraging.”

(P11) “It is better than nothing. You need a little bit of cultural shift, starting with something cheap and cheerful, something that might not be ideal but is still functional would be a good starting point.”

(P12) “There would need to be a certain amount of quality control. If they were adaptive to take into account local requirements that would be a great idea. Cultural acceptance could be a problem.”

Question 27 ‘*What do you think the likely reason would be for not wanting to wear a life jacket?’*

(P4) “It is probably not high up on their priority list. Or they do not think the conditions need it, there is not any available, their money needs to be spent elsewhere, they might not have any [life jackets] anyway. There is a bit of care-free attitude and to them everything is a risk all the time. They do not know any different.”

(P5) “Peer pressure and not appreciating the dangers. As no one else wears them, do they really need too.”

(P6) “Lack of access, a cultural thing, perception of weakness, never having had an accident why would you suddenly change your behaviour.”

(P7) “In the African fishing industry there is a bit of machismo there. There seems to be a stigma to wearing a life jacket.”

(P9) “The perception I think, some of the older ones it would be comfort factor and fashion statement. I can’t be seen wearing that old thing.”

(P10) suggested that “there is a confrontational and teenage years the peer pressure bites. You do not look cool, and it is uncomfortable. It could be social influence more than anything.”

(P11) “Over there maybe apart from the peer pressure surely you need a little bit of cultural shift, I think. It could also be a macho thing. You could be perceived as being incompetent and unable to swim.”

(P12) “They are quite cumbersome and hot when you are doing physical activity when you are wearing a big bulky life jacket, and I think there is something about perception of risk. There are possibly lots of reasons for not wearing a life jacket, it would be down to the individual to decide if conditions warranted wearing one or not”.

Question 28 ‘*Can you make any suggestions to reduce drowning events in these areas?’*

(P2) “Training, making people aware of drowning. Prevention of drowning it’s not just obviously the worsening conditions to take into account.”

(P3) Argues that “macho men do not wear them. I have been to African countries a few times and the general attitude of people can be carefree.”

(P4) “Trying to educate them you come across as he white privileged again. Help them in a supportive role educating them and working together to help. Supply safety equipment so they know how it works.”

(P6) “Education in terms of being able to swim, understanding how people drown, education about the wearing of life jackets, and they are not a sign of weakness. If you teach people to swim, will they think they do not need a life jacket because they can float.”

(P7) Points out that “kids would not necessarily be able to afford swimming lessons. Better communications amongst fishermen about changes in weather. Also, a better understanding from fishermen about impending weather conditions or better communication between fishermen. If they lose their lives when fishing what do their family’s do?”

(P8) “If you have a waterproof phone can you make it send a distress message.”

(P10) “Don’t fall in. A storable life jacket that would be handy.”

(P11) “Getting people to learn how to swim when they are in primary school. Trying to get young people to instil in their mind the importance of safety on the water. Trying to reach the youngest in the population to promote safety in that way.”

(P12) “I do think some kind of competency check is useful. Have quality control to make sure the boat is sea-worthy. They go out there because of poverty, and its one way of earning money. Provide alternative employment and provide alternative income to feed those families.”

Question 29 '*What life jacket safety features do you consider as essential?'*

(P1) "A life jacket that supports you until it inflates."

(P2) "Keeping your face upwards and staying in the right place otherwise it could easily kill you. The essential thing is 100% reliability, a key factor."

(P4) "A good whistle, it takes not a lot of effort, but it is quite affective. something that would alert people to where you are. A high vis made of reflective material. Ultimately the primary function is to keep you afloat until you get rescued."

(P5) "Everybody should have the experience of being in the water next to a boat so they can see how difficult it is to get back on board."

(P6) "A light would be essential especially if you're in the dark in the water. Straps to haul you out."

(P7) "An automatic one so I do not have to manually inflate it."

(P9) "It is all down to education. Do they know how to use an inflation tube if the gas cylinder has not gone off?"

(P10) "It has to be able to keep my head above the water. Anything that aids survival."

(P11) suggested that "Something that is easy to re-pack when you want to inspect the contents, gas bottle and mechanism."

(P12) "Something to keep your head above water. A spray hood is really important. It is the secondary drowning that kills a lot of people. You could have a Bluetooth (wireless technology) M.O.B. panic button linked to your mobile phone which sends out a distress signal with your location. Having a collar that keeps your head above water and righting yourself plus facing the right way round to the wind and waves."

Question 30 '*Is there anything else you would like to add?'*

(P3) Suggested that "in dinghies and small boats they should always wear life jackets. A small boat is an incredible dangerous place especially after having a drink."

(P6) “There should be more regulations around boats in general including legislation around the wearing of life jackets.”

(P7) “It is the poverty there which is one of the key drivers of all this. They are living at a very basic level. They have lots of issues to deal with and thinking about their safety on the water is not something that is paramount.”

(P8) “A better designed craft, safety equipment, and education.”

(P9) “I had not thought of a life jacket like the aircraft one that is easier, lighter, cheaper for people to have and use. Would you be better having a slightly different design?”

(P11) “You could never give them the best of the best but something that is basic would at least allow them to get some help if they find themselves in the water. Just to keep them afloat.”

(P12) Concluded that “I think it’s a very interesting project. What is needed is education, anti-drowning, and anti-stupidity training. You might suddenly find that more people are taking up fishing because they have life jackets. The unintended consequences of that are the biodiversity levels drop even more and the market price goes down as there is more fishermen. People would be over exploiting the waters of Lake Victoria.”

4.7 Interviews Summary

Because of covid restrictions all interviews had to be conducted using an on-line Zoom account. The questions addressed all the research themes including culture, risk, alcohol, education, life jacket use, and legislation. Questions 1-8 were designed as ‘warm-up’ questions, to relax the participants. Not all the answers were transcribed, just the ones deemed relevant to the research. Overall participant response to the questions was very positive.

5.0 Discussion

Following the data collection and subsequent analysis data suggests there is no obvious reasons why so many fishermen drown each year in Lake Victoria. With the Lake Victoria Commission and Red Cross estimating that approximately 5000 people drown each year in the waters of Lake Victoria, the importance of wearing some type of floatation aid or life jacket should be considered a sensible precaution. So it was surprising that only half of the participants admitted to routinely wearing a life jacket. Although it is worth noting that none of the participants had any commercial fishing experience or witnessed for themselves how Ugandan fisherman survive the reality of life on a small open boat. Nevertheless, all the participants had undertaken man-overboard training and had completed a sea survival course and therefore they know the problems someone might possibly experience if they fell overboard without a life jacket: cold water shock, hyperthermia, asphyxia, apnea, and death (RLSS 1988 p109). In the UK most sailing clubs and charter boats supply life jackets and safety equipment, whereas Ugandan fishermen are limited in their choice of safety equipment. This is due to beliefs by various fishermen that life jackets are cheap reproductions and of poor quality and cannot be relied on to work properly (Hattem 2017). However no data was found to support that assumption in the performance of the life jackets available. The RNLI (2005) ran a 'Which life jacket for you' campaign to find suitable life jackets that fishermen deemed appropriate for use. The campaign proved successful and increased life jacket use amongst UK fishermen involved in the campaign. Consequently, it is the responsibility of fishermen or sailors to select a floatation aid that suits their requirements.

It was evident from participants' answers (Question 9) that not everyone that goes boating in the UK likes wearing a life jacket despite the availability and knowledge afforded to them of the benefits of wearing one. Although participants may not have experienced accidental immersion themselves, they assume because they can swim there is less risk involved. Yet if someone fell overboard wearing a life jacket, survivability in UK waters increases from 73% to 94% (Pitman *et al* 2018). However data is speculative regarding drowning fatalities and swimming abilities. Even the United Nations (UN) identifies that drowning is preventable if low-cost measures are taken i.e. wearing a life jacket (RNLI, 2021). Subsequently the evidence is clear that, regardless of area, if everyone who travelled on water was encouraged

to wear a life jacket, there would almost certainly be a marked decrease in drowning fatalities.

5.1 Cultural Aspects of Ugandan fishermen

Wearing a life jacket or any type of flotation aid could be perceived as the wearer being a non-swimmer or scared of the water. Yet surprisingly none of the participants thought that wearing a life jacket or showing any sort of fear, would lead to abuse from their peers. Although there seemed to be a lot of uncertainty and vagueness in the participants' perspective when answering questions surrounding the wearing of life jackets and more importantly, the reasoning behind their comments. Kwiringira *et al* (2019) believes that it is the sub-culture that determines fishermen's attitudes when it comes to risk-taking. Their pursuit of catching fish influences their judgment towards personal safety, affecting decisions they make. Smith & Wilen (2005) advocates that fisherman are risk takers, and that risk produces a biological response, an adrenaline rush that gives the risk taker a sense of achievement. The comments by Smith & Wilen are questionable in this scenario as an adrenaline rush is not the main reason why Ugandan fisherman risk their lives. It is arguably that the majority are very poor (Omwega *et al* 2005 p193) they need to catch fish to provide a living for their family and dependants.

Participants seem to agree that there are multiple reasons for not wearing a life jacket, and that more than one solution is needed to resolve the problem. Data from the survey showed that participants believe that comfort followed by usability are the main factors for not wearing a life jacket. Participants also agreed that the wearing of life jackets when involved in any physical work onboard a boat can be prohibitive as webbing straps and overall bulk restricts movement. Or the non-wearing of life jackets could be due to peer pressure or possibly it is a 'macho' image amongst young males who want to impress their friends or elders. One participant commented that fishermen and Ugandan people in general seem to have a care-free attitude towards safety, they do not appreciate the dangers involved. But it is important to remember this is more speculation supported by observation in the literature than first-hand experience providing that view. Kwiringira *et al* (2019 p1) supports the view that fishing in Uganda is by definition a "sub-culture of risk takers". Nevertheless, as fish

stocks decrease risk-taking will ultimately increase as fisherman travel further offshore into deeper waters and away from the safety of land.

Education and cultural beliefs are important factors when educating fishermen in the use of life jackets and the dangers inherent with fishing from a small vessel. When answering Question 27 and 28, Participant 6 believes that educating people on the dangers associated with fishing, teaching people to swim, and the value of life jackets will not bring about a change in cultural behaviour. Moreover, participant 5 suggests that many fishermen do not appreciate the dangers involved and view the use of safety equipment as a perception of weakness. Therefore, considering these two participants views can help one to understand that education on drowning prevention does not necessarily alter people's perception or cultural beliefs.

Participants were divided in their opinion that there was some sort of Ugandan cultural stigma or cultural belief that decides an individual's decision to wear a life jacket or not. But 83% of participants did partly agree that peer pressure can influence decision making, more so than taking a common sense approach to safety. Bravado amongst young males who like be seen as risk takers to impress friends and colleagues can also influence attitudes towards personal safety (Irwin *et al* 2011).

5.2 Religion

Uganda has a diverse range of religions with Islam and Christianity making up the majority of the population (Britannica 2021). Ugandans believe that the god *Mukassa* rules over Lake Victoria and influences the wind and weather (Parrinder 1967). However, in data collection there was not enough knowledge or experience on the cultural aspects of Ugandan people or religion for participants to give an informative answer as to whether they believed that religion influences any aspect of safety amongst fishermen. This is further complicated by the fact that Uganda has over 30 ethnic tribes each with their own diverse language and socio-culture (Atukunda & Ahmed, 2012).

5.3 Alcohol

Drinking alcohol while fishing especially at night accounts for numerous drowning fatalities due to the increased risk factor of fishing in the dark on moonless nights with only a pressure lamp for illumination to lure fish (Eggert & Lokina 2007). Over three-quarters of the participants agreed that the drinking of alcohol should be banned when working on commercial or fishing vessels. Unsurprisingly the participants answers support previous data in the literature review that the reason is most likely due to their lack of education surrounding the dangers of alcohol. The consumption of alcohol affects balance, central nervous system, and cognitive processes (Driscoll *et al* 2004) a dangerous combination on a moving platform, hence why alcohol is cited as a major contributor to drowning fatalities (Mittlestaedt *et al* 2000).

The problem is further compounded where in Uganda locally brewed alcohol is cheap to obtain, readily available and drinking deeply permeates their culture (Myadze & Rwomire 2014). There is a national legislation to restrict excessive drinking, but it is very difficult to enforce. Not only that but it could be considered that it infringes on fishermen's human rights. A disturbing finding by Ssebunnya *et al* (2020) points out that according to the 2004 Global Status Report on alcohol, Uganda had the highest annual consumption of alcohol in the world. With so many small craft involved in fishing, imposing any form of licencing, or regulatory control of alcohol would be almost unmanageable and expensive to administer whereas education on the dangers associated with alcoholism and alcohol abuse would be a much cheaper option as a means of influence.

5.4 Safety Representative

Although villages by tradition have village elders as their community leaders each village could do with a designated safety representative, someone with authority to look after the welfare of fisherman and their families. All participants unanimously agreed (100%) that having a safety representative was a good idea. A safety representative should be someone the fishermen respect, someone of wisdom that knows of the dangers associated with fishing. But with approximately three million people relying on Lake Victoria to provide a living it would be highly unlikely that Uganda would fund a government department to oversee all

aspects of fishermen's safety. As an example of cost the UK's Maritime and Coastguard Agency (MCA) net operating expenditure for 2019-20 was £356 million (MCA annual report). Unless Uganda's government intervenes, responsibility for fishermen's safety will continue the preserve of the individuals concerned.

5.5 Legislation

As reported by the RNLI "in the Republic of Ireland the law requires that an appropriate life jacket or buoyancy aid must be carried for everyone onboard all vessels." The same ruling applies for coded vessels in the UK. However there are no mandatory rules for the wearing of life jackets on small private boats in the UK. Even children are exempt which is shocking given the statistics involving the benefits of wearing a life jacket. Although it has now become compulsory in the UK for all commercial fishermen to wear a life jacket or use a safety harness at sea (Marine Safety Notice (MSN) 1871). Despite the ruling accidents including fatalities are still a regular occurrence as reported by the Marine Accident Investigation Branch (MAIB) Fishing News (2019). One such reason for this is the Maritime and Coastguard Agency confirmed they have evidence that harnesses and life jackets are still not being worn. If the law is unenforceable in the UK, then there is little chance of enforcing the law in Uganda where there is less policing due to a lack of resources and financing.

From the data, there were mixed responses amongst participants when it came to the mandatory wearing of life jackets. They believed that although sensible, the compulsory wearing of life jackets takes away a person's freedom of choice. However behaviour issues on safety are widespread, and not just confined to Uganda. Some charter companies and yacht clubs in the UK are now insisting that life jackets 'should' be worn at all times although this is difficult to enforce which echoes the RNLI who go to great lengths to advocate this point "a life jacket can only save you if you're wearing it."

5.6 Licencing

The amount of people taking boats out across Lake Victoria to fish is increasing all the time. There does not appear to be any enforceable rules regulating small boat owners. Although

Uganda does have the Fish Act (Ch 197) which was revised in 2010 to protect fish stocks. Participants agreed by 91% that there should be some form of regulations or licencing system to control and protect fishermen regardless of their fishing abilities. Without a registration or licencing system anyone can purchase a boat of reasonable size and put people's lives at risk without any formal training. Daghar (2019) further suggests that without strict controls to curtail the number of boats fishing Lake Victoria, drowning fatalities will increase. Whereas UK fishing vessel licences are issued by the Marine Management Organisation (MMO) who control regulations, and monitoring. They also undertake fishing vessel inspections, and they operate a compliance and enforcement strategy.

5.7 Affordability

Ugandan fishermen who cannot afford good quality life jackets of European standard might be tempted to choose cheaper life jackets of poor quality (Elgie 2021). This is in contrast to the UK where life jackets have to meet strict standards of quality. Since July 1995; it has been illegal to sell life jackets or buoyancy aids that do not conform to European or International specifications. However half of the participants agree that cost would be one of the deciding factors involved when purchasing. Although it is possible to buy cheap life jackets of a reasonable standard in the UK, it is not certain that if they were made available in Uganda fishermen would want to wear them. It could be as Hattem (2017 p1) suggested that some Ugandan fishermen were "distrustful" of life jackets, as they look "fake and cheap". Equally a good life jacket does not have to be a 'state of the art' product to keep someone afloat, a simple design of good standard that is easy to understand will do the same job just as well. One participant suggested that a cheaper basic life jacket would be a good 'starter' for those people that cannot afford a high end product. But others argued that a cheap life jacket should still be made to a good standard, as all lives are just as valuable no matter where people live.

5.8 Government Subsidy

A government subsidy or grant towards safety equipment would enable fishermen to purchase life jackets of a good standard, as affordability combined with quality makes for a desirable product. Nearly all participants at 92% agreed that any form of government subsidy

might encourage people to purchase a life jacket. It is reported that there are “high poverty levels that exist among the fishing communities” (Abila, *et al* 2006) and that fishermen cannot afford to purchase life jackets. As previously mentioned, (Elgie, 2021), there are cheap ones available but crucially Ugandan fishermen do not trust them, especially when local authorities question them. They are sceptical of cheap life jackets and believe that they could be a fake product that would not be fit for purpose (Hattem 2017). In 2013, various organisations in the UK (SFF, NFFO, Seafish, and Fishermen’s Mission) issued life jackets to fishermen either free of charge or heavily subsidised (MAIB Report 2013). If the Ugandan government subsidised the cost of any type of floatation aid, that would at least give encouragement to those who might consider buying a life jacket. This idea was supported by 91% of participants.

However during the interviews half of the participants would definitely not buy the cheapest, as they wanted a life jacket that was of good quality made to a high standard, questioning the suggestion that financial aid would improve take up of purchasing a life jacket. Their answers depended on what they wanted from a life jacket, or how much they were prepared to pay. They did not consider; how much in monetary terms they valued their life? This reflects the consensus of Ugandan fishermen and their attitudes towards safety and cost. Although 91% of participants thought that a cheaper life jacket might encourage use especially amongst Ugandans.

5.9 Standards

The complexities surrounding the wearing of life jackets for anyone can be seen even in the data within this project. There was further confusion from responses when all participants in Question 13 wanted life jackets that conformed to their own requirements, there was no mention of meeting British standards. This coincided with the fact they were not worried about having a life jacket conforming to standards in the previous question. Furthermore, some half of the participants also wanted various features as proposed in the summary section of this report. These apparent changes in opinion could be described as somewhat hypocritical but on further consideration, it could be that making the participants think about the alternative style of a life jacket and what could be incorporated has made them revaluate their initial responses.

Keeping the above in mind, participants agreed that any form of life jacket must be made to a certain standard of quality. In the UK all Personal Protective Equipment (PPE) must meet maritime standards of acceptance, similar to European commercial (SOLAS) approved life jackets (SOLAS, 2018). Any participant wanting to purchase a life jacket, albeit one that met their requirements would only buy one providing it was comfortable, durable, and functional. Surprisingly for this response cost was not a deciding factor, however previous comments in the data have echoed this view which indicates a more consistent approach within people's attitudes. Even though participants could not agree on the type of life jacket they prefer, they were all unanimous to the fact that wearing any type of life jacket, one that is automatic or has manual inflation is better than wearing nothing at all. Research has shown that in Uganda it has now become possible to purchase locally made life jackets, but the product's quality and standard of worthiness is questionable. As a result, local authorities denounce them as fake, and not fit for purpose (Elgie, 2021).

5.10 Alternative Designs

What was unexpected is that it appears the participants have contradicted their opinions, despite earlier comments regarding purchasing a cheap life jacket. In a later question they were interested in wearing a light weight, 'basic' design styled on an 'inflatable commercial aircraft life vest' as long as the primary purpose of the life jacket was to keep the wearer afloat and were less enthusiastic about purchasing a UK/European approved life jacket. The suggestion of a life jacket for fishermen styled on an inflatable commercial aircraft life vest was a consideration based on interviews from a previous research project into life jacket design (Mills 2020). Foam filled buoyancy aids were also considered for discussion, but they were deemed inappropriate for commercial fishermen as they are designed mainly for water sports, transportation, and leisure activities.

This type of life preserver (Type1) (see Appendix 'E') as recommended by the Federal Aviation Administration (FAA) has all the basic qualities needed in a life jacket: a manually operated inflation mechanism (non-automatic) coupled to a CO2 cartridge with oral inflation backup tube, and a water activated signal light (SWITLIK 2021). Commercial aircraft life

vests have to meet minimum performance standards as approved by the European Aviation Safety Agency (EASA) (ETSO TSO 1992). These include non-metallic materials physical properties, strength, fabric coat adhesion, permeability, seam strength, and temperature variations. Furthermore material, webbing and thread are tested for tensile strength, flammability, UV radiation and corrosion resistance. The unexpected reaction to the use of this type of life jacket could therefore have some bearing on the answer to the problems that have led to this project. As comparison modern European/UK life jackets use 3D (dimensional) technology in their design. They are available with an ergonomically designed bladder with duel asymmetric lobes, and hydrostatic auto inflation. These are just a few of many technological advances incorporated in modern designs.

Life jackets are designed to save lives, that is the sole purpose for wearing one. Participants agree that Uganda needs to adopt a style of life jacket designed to suit the needs of their fishermen as supported by the literature. Preferably a life jacket that is comfortable, of good quality, is affordable, and reliable combined with the five basic requirements proposed by Pask (1961 p1140) which set the standard for life jacket design.

1. Once inflated a life jacket should provide enough buoyancy to support a human being on the surface of fresh water.
2. A life jacket should be easy to put on or be so compact that it can conveniently be worn during periods of risk.
3. The life jacket should be resistant to deterioration due to storage in various climate conditions or to the stress of use and misuse.
4. If possible, the life jacket should allow the wearer to ‘swim’ easily.
5. If possible, the life jacket should support a week or helpless person so that their mouth and nose remain clear of water without effort on their part.

Although Pask’s proposals were suggested 60 years ago, they are still relevant today and are seen as the foundation for standards relating to life jacket design. Participants agreed that as a minimum requirement those standards should be observed even for LMICs.

5.11 Participant Suggestions

During the course of this project, there were several interesting comments from participants as viewed from a different perspective which are worth some merit. Reducing the amount of people that go fishing, reduces the number of drowning fatalities and ‘don’t fall in’ which sounds a little bit simplistic, but is a sensible solution, and one that should be taken very seriously. Education on all aspects of safety while on the lake or at sea should prove worthwhile even though fishermen might ignore the advice. Ugandan fishing vessels (skiffs) are rudimentary in their design, greater emphasis should be given to making the vessel more sea worthy. A higher free-board perhaps, or the installation of an out-rigger with safety netting added as an in-fill, anything to make the vessel a more stable platform.

While these are valuable thoughts and viewpoints on essential features, it was hoped there would be some more original suggestions. Life jacket ideas included: A conventional automatic life jacket that relies on the dissolving of salt tablets to trigger inflation, needs to be able to keep your head above water before inflation commences. Also mentioned was after immersion, the difficulty of climbing back on board (vertical reach) which can be extremely difficult especially when wearing an inflated life jacket, another possible factor of drowning worth consideration. Some existing life jackets have one-way zips and Velcro fixings which are not ideal. Trying to re-pack an inflatable life jacket can be an arduous, and difficult task which is better suited to an experienced person. Whereas a passive aircraft life jacket has no protective covering to re-pack, only a few bladder retaining poppers. Foam life jackets were considered by participants but because of the jackets ‘bulk’ they were deemed unsuitable as they restrict body movement. The Bluetooth panic button linked to a mobile phone was considered a good idea as Ugandan fishermen are very keen on their mobile phones, however the problem with any electrical device especially when afloat is the power source.

A crucial factor which was not touched upon by the participants was the use of colour in life jacket design. A distinctive aesthetically pleasing design taking into account fishermen’s requirements or desires. i.e. colour of their favourite football team, an advertising slogan, their national flag, or just their favourite colour makes the design more desirable as colouring is an important factor in desirability. The use of colour in a material can evoke strong feelings

and emotions. Colour can also portray different symbolic meanings of consequence, i.e. religion, and cultural differences.

In respect to the data collected, when asking participants if they fully understood the problem and had any viable suggestions their replies were a mixture of what had been covered already plus a few that had not, such as educating fisherman on the dangers of drowning, swimming lessons and additional safety aids. If education was made available? it is uncertain that fishermen would fully comprehend the dangers associated with fishing. Surprisingly 50% of qualified participants admitted to a casual attitude towards the wearing of life jackets. A majority of participants raised concern over exploitation, risk, and legislation. Participants agreed that fishermen's safety on the water is not considered as an essential requirement. It is poverty and the need to earn a living to feed their dependants that drives fishermen to take unnecessary risks. In the UK society considers safety as paramount before financial concerns, which sadly is in direct contrast to the situation in Uganda.

5.12 Summary

When summarising this work it is important to acknowledge that participants were a bit vague when discussing Ugandan sub-culture and fishermen's attitudes towards risk-taking. This was because a lot of the data was built on assumption due to their limitations of knowledge having not been to Uganda or experienced their culture. Although reliable data on fishermen drowning in Lake Victoria is limited, an analysis of the literature review and participant interviews identified important themes of concern. There is a strong belief among organisations like WHO, MAIB, RNLI, Red Cross etc, that if everyone was to wear a life jacket a significant number of lives would be saved. Unfortunately Ugandan fishermen do not trust life jackets especially cheap ones as they believe that they are unreliable and may fail when required. The non-use of life jackets by fishermen was comparable with participants' experiences who also found the wearing of life jackets to be uncomfortable and intrusive.

In addition, peer pressure and bravado amongst young males influences their judgment when it comes to personal safety and risk taking. Poverty and the need to earn a living forces fisherman into taking risks. Risk combined with a care-free attitude plays a part in

fishermen's safety but with also the need to wear some form of flotation device. Religious belief in Uganda is a very large subject which most of the participants knew little about mainly because of religious diversity and the lack of available data. Not surprisingly, alcohol was a controversial subject as not everyone agreed to limiting alcohol consumption even though alcohol is a major contributor to drowning fatalities. National legislation in Uganda already exists to curtail excessive drinking, but it is largely ignored mainly because locally brewed alcohol is cheap, and easy to obtain. Furthermore, alcohol forms a significant part of Uganda's culture and way of life.

Considering legislation, participants agreed that if it was brought in for fishermen to wear life jackets, they would probably ignore the ruling as it is not enforceable. The same can be said for a licensing system to control fishing vessels, there would not be enough government money or officials to police the ruling. Any form of regulations, licensing, or the mandatory wearing of life jackets system would be unenforceable due to a lack of empowerment by the authorities. Also highlighted were the perspectives and views from participants when considering fishermen's safety. When it came to fishermen's health and wellbeing, all participants were in favour of having a designated safety representative overseeing issues of safety such as conditions of vessels, equipment on board and crew competency. However, not all the data supplied by the participants matched the findings. Answers to questions on cost and standards produced various amounts of contradiction which would need further investigation.

Uganda is not unique when it comes to high drowning fatalities, but it does have one of the most incidences of drowning of any LMICs (Whitworth *et al* 2019). As the need to catch more fish intensifiers so does the probability of more fishermen drowning. This research has predicted that unless a viable solution can be found the loss of life will undoubtably intensify. Participants like the idea of a desirable, affordable life jacket that is fit for purpose as long as the life jacket conforms to the necessary safety checks and a given standard of quality. As the literature review indicates a life jacket has to appeal to the user. It has to be functional, practical and above all comfortable. Life jacket comfort is one of the biggest complaints from users. It is the main reason given by participants for the non-use of life jackets. A life jacket

that gives total freedom of movement and has no obtrusive fittings would increase desirability.

6.0 Conclusion

Data obtained from the literature review, and sampling procedure was analysed using a mixed methods approach. Planning, analysing, and evaluating data from semi-structured interviews combined with a fundamental literature review produced valuable research data. The results although not conclusive highlight the possibility that new technology when combined with traditional life jacket designs can be used to influence a change in cultural habits and beliefs. As the research project progressed it became obvious that the reasons for drowning were complex with no easy solution. Various factors contribute towards the high number of drowning fatalities as reported by the WHO (2018).

- A lack of education on the dangers surrounding fishing from small vessels.
- A disregard for personal safety due to beliefs infused into Ugandan culture.
- A general reluctance to wear any form of PFA.
- A culture of risk taking in the pursuit of a good catch.
- A shortage of affordable 'dependable' life jackets

There is no guarantee that the wearing of a life jacket would save a person's life, but research has shown that the chance of survival is dramatically increased if wearing one. It is central to the argument and of vital importance that if fishermen's survival rates are to increase, life jackets must be worn to be effective.

Because of the various complexities associated with drowning prevention, substantial changes would be required in legislation, behaviour, and cultural attitudes if a reduction in drowning events is to be realised. Any policy or plan that involves drowning prevention should also consider personal, communal, and environmental concerns. Subsidising the purchase of life jackets (or make them free to fishermen) would encourage use and could potently inspire other water users. Also to be considered and of equal importance is education and training. Although as the MAIB review (2016 p20) suggests, trying to educate fishermen on the importance of drowning prevention could prove difficult without the enforcement of mandatory regulations.

The original aims and objectives have been partially met. There was no specific answer to the research question due to the number of variables associated with drowning fatalities. Justifying the need to wear a life jacket at all times has been supported from the research data. Although a good quality life jacket would give better protection in rough weather, a simplified version that was deemed unobtrusive and affordable is more likely to appeal to Ugandan fishermen. It was not expected that gathering data will solve the drowning problem but alleviating the problem through education, legislation, and design does have the potential to do so. Consideration was given to the different types of research that could be used for gathering relevant data to answer the research question but asking a research question which has a limited amount of up-to-date qualitative data was always going to be difficult during the current covid-19 pandemic restrictions.

7.0 Future Research

The production and distribution of redesigned life jackets based on the recommendations of this report is an interesting possibility, however current legislations and standards of quality might impede the development process. Although this research focuses on Lake Victoria it also takes into account those of the international community. Drowning is seen as a World-wide problem and any future research on drowning prevention, could prove beneficial to everyone, young or old. Further work is needed in order to gain a greater understanding of the complexity surrounding drowning events and drowning prevention strategies.

8.0 References

Abila, R, O., Omwega, R, N., Lwenya, C., (2006) Fishing and poverty levels around Lake Victoria (Kenya) [online] http://hdl.handle.net/1834/1495 [accessed 27th September 2021].

Atukunda, G., Ahmed, M., (2012) Analysis of Incentives and Disincentives for Fish in Uganda. Technical notes series, MAFAP, FAO, Rome. [online] http://www.fao.org/mafap [accessed 23rd March 2021]

Ball, P., (1999) H_2O A Biography of Water. Epilogue, Blue Gold, water as a resource. London: Phoenix. pp 313-346.

Bell, J., (2010) Doing your research project. *Open Up Study Skills*. Fifth Edition. London: Open University Press. Pp 45 - 63

Bierens, J, J, L, M., Lunetta, P., Tipton, M., Warner, D, S., (2016) Physiology of drowning: a review. Physiology 31, pp 147-166.

Bond, A., (2004) Writing Your Master's Thesis. *How to plan, draft, develop and publish your thesis*. United Kingdom: Studymates.

Bracha' A., Brown, D, J., (2011) Affective decision making: A theory of optimism bias. *Games and Economic Behaviour*. 75 (2012), pp 67 – 80. Elsevier.

Breuer, C., Bloom, B., Miller, A, P., Kigozi, G., Nakyanjo, N., Ddaaki, W., Nalugoda, F., Wagman, J, A., (2019) "The Bottle is my Wife": Exploring Reasons Why Men Drink Alcohol in Ugandan Fishing Communities. *Social Work in Public Health* 34:8, pp 657 - 672

Britannica (2021) Religion of Uganda [on line] www.britannica.com/place/Uganda/Religion [accessed 19th October 2021]

Brott V (2006) Lake Victoria, A shared Vision. *Swedish International Development Agency* (SIDA): Stockholm, Sweden. *In* Makalle, A, M, P., Obando, M, J., Bamutaze, Y., (2008) Effects of land use practices on livelihoods in the transboundary sub-catchments of the Lake Victoria Basin, *African Journal of Environment Science and Technology* vol. 2 (10) pp 309-317.

Carel Van Dorp, J., (2006) Handbook on Drowning: *Prevention, Rescue, and Treatment*. Amsterdam: Springer.

Collins, H., (2019) Creative Research, The theory and practice of research for the creative industries. *Generating and refining research ideas*. Second Edition. London: Bloomsbury. pp 25-36

Creswell, J, W., (2009) Research Design, Qualitative, Quantitative and Mixed Methods Approaches. London: Sage.

Daghar, M., (2019) Illegal Fishing in Lake Victoria Endangers Livelihoods and Species. ENACT project, ISS. 2nd July 2019

Davis, C, A., (2008) Reflexive Ethnography, *A guide to researching selves and others.* London: Routledge.

Dawson, C., (2012) Introduction to Research Methods. *How to decide upon a methodology*. United Kingdom: How to Books Ltd.

Dillion, J, L., Scandizzo, P, L., (1978) Risk Attitudes of Subsistence Farmers in Northeast Brazil: A Sampling Approach. American Journal of Agricultural Economics. Volume 60, Issue 3 August 1978 pp 425-435

Donson, H., and Niekerk, A, V., (2011) Unintentional drowning in urban South Africa: a retrospective investigation, 2001-2005. International Journal of Injury Control and Safety Promotion Vol 20 (3) pp 218-226

Driscoll, T, R., Harrison, J, A., Steenkamp, M., (2004) Review of the role of alcohol in drowning associated with recreational aquatic activity. *Injury Prevention* . 2004;10 (2) pp 107-113

European Aviation Safety Agency (EASA) (2006) European Technical Standards Order ETSO-C13f Life Preservers [on line] https://www.easa.europa.eu/download/etso/ETSO-C13f_CS-ETSO_1.pdf [accessed 18th November 2021]

Eggert, H., Martinsson, P., (2004) Are Commercial Fishers Risk Lovers? *Land Economics* 80 (4) pp 550-60

Eggert, H., Lokina, R, B., (2007) Small-scale Fishermen and Risk Preferences. *Marine Resources Economics*, Vol 22, pp 49-67

Elgie, I., (2021) United Nations Association Eastbourne. [online] http://www.unaeastbourne.org/life-jackets-to-reduce-hiv.html [accessed 6th June 2021]

Encyclopaedia Britannica (2021) Lake Victoria, Africa [on-line] www.britannica.com/place/Lake-Victoria [accessed Feb 21st 2021].

Fishery Exports and the Economic Development of LDCs (2017) Chapter 9. *Case study: Uganda*. Pp 39-44

Graham, D., Mecrow, T., (2013) (*Oral Presentation*). In Denial – exploring the real risks around the water in Africa. *World Conference on Drowning Prevention in Potsdam, Germany* 2013. International Life Saving Federation.

Gray, D, E., (2009) Doing Research in the Real World. *Theoretical Perspectives*. Second edition, London: SAGE.

Greetham, B., (2008) How to write better essays. *Palgrave Study Skills*. Second edition, London: Palgrave Macmillan.

Gross, R., (2014) Psychology. *The Science of Mind and Behaviour*. Sixth edition, London: Hodder Education.

Hattem, J., (2017) Why do so many Africans drown? *freelance journalist based in Uganda*, Article made public April 27, 2017, 3:43 PM ET.

Hogg, M, A., and Vaughan, G, M., (1995) *Social Psychology*: An Introduction: Hemel Hempstead: Prentice-Hall/Harvester Wheatsheaf. *In* Gross, R., (2014) Psychology. The Science of Mind and Behaviour p367. London: Hodder Education.

Irwin, C, C., Irwin, R, L., Ryan, T, D., Drayer, J., (2011) The Legacy of Fear: Is Fear Impacting Fatal and Non-Fatal Drowning of African American Children? *Journal of Black Studies*, Vol. 42 No 4 pp. 561-576

Kobusingye, O., Guwatudde, D., Ower, G., Lett, R., (2002) Citywide trauma experience in Kampala, Uganda: A call for intervention, *Injury Prevention* Vol 7 No 2 pp 133-136

Kobusingye, O., Tumwesigye, N, M., Magoola, J., Atuyambe, L., Olange, O., (2017) Drowning among the lakeside fishing communities in Uganda: results of a community survey. *International Journal of Injury and Safety Promotion,* 2017 Vol 24, No 3 pp 363-370

Kwiringira, J, N., Ariho, P., Zakumumpa, H., Mugisha, J., Rujumba, J., Mugisha, M, M., (2019) Livelihood Risk, Culture, and the HIV interface: Evidence from Lakeshore Border Communities in Buliisa District, Uganda. Hindawi, *Journal of Tropical Medicine*. 2019, Article ID 6496240.

Leavy, J, E., Crawford, G., Portsmouth, L., Jancey, J., Leaversuch, F., Nimmo, L., Hunt, K., (2015) Recreational Drowning Prevention Interventions for Adults, 1990-2012: A Review. *Journal Community Health*. New York: Springer.

Lonial, S, C., Zaim, S., (2000) Investigating of Product Attributes and Their Effect on Overall Satisfaction. Faith University Publication pp 553 - 565

Marine Accident Investigation Branch (MAIB) (2016) Lifejackets: a review. [online] www.gov.uk/maib [accessed March 10th 2022].

Mchau, G, J, Makule, E., Machunda, R., Gong, Y, Y., Kimanya, M., (2019) Harmful algal bloom and associated health risks among users of Lake Victoria freshwater: Ukerewe Island, Tanzania. *Journal of Water and Health* 17.5 pp 826-836

McFadden, E, B., (1978) Floatation and Survival Equipment Studies, *FAA Civil Aeromedical Institute,* U.S. Dep of Transport, Article No FAA-AM-78-1.

Miller, L., Alele, F, O., Emeto, T, I., Franklin, R, C., (2019) Epidemiology, Risk Factors, and Measures for Preventing Drowning in Africa: A Systematic Review. *Medicina* 2019, 55, 637. Australia: MDPI.

Mittlestaedt, A., Bartram, J., Wooler, A Pond, K., Mood, E., (2000) Chapter 7*: Physical Hazards, Drowning and Injures. *Monitoring Bathing Waters – A practical Guide to the Design and Implementation of Assessments and Monitoring Programmes.* London: E & FN Spon.

Mills, R, (2020) Life Jackets: Perception of Usability. *MSc Product Design*. Bournemouth University, United Kingdom.

Mulligan, G., (2018) Could a text message save thousands of fishermen's lives? [On-line] www.bbc.co.uk/news/business-44321393 [accessed Feb 21st, 2021]. *Report linked to* International Red Cross (2021) [on-line] www.redcross.org.uk/stories/disasters-and-emergencies/world. [accessed Feb 21st, 2021]

Myadze, T, I., & Rwomire, A., (2014). Alcoholism in Africa during the Late Twentieth Century: A socio-cultural perspective. *International Journal of Business and Social Science*, 5 (2) February 2014.

Omwega, R, N., Abila, R., Lwenya, C., (2005) Fishing and poverty levels around Lake Victoria (Kenya). Proceedings of the *11th World Lakes Conference*: vol. 2. pp193-199

Onyango, P., Jentoft, S., (2010) Assessing poverty in small-scale fisheries in Lake Victoria, Tanzania. *Fish and Fisheries*, 2010, Vol 11 pp 250-263

Opio, A., Muyonga, M., Mulumba, N., (2013) HIV Infection in Fishing Communities of Lake Victoria Basin of Uganda: A Cross-Sectional Sero-Behavioral Survey. PLoS One, 2013; 8 (8): e70770.

Parrinder, G., (1967) African Mythology. 1st edition, Publisher Littlehampton Book Services Ltd.

Pask, E, A., (1961) The Design of Life-Jackets. *British Medical Journal*, Oct 28th pp 1140-1142.

Peden, M., (2000) National injury surveillance system, a profile of fatal drownings in South Africa. 1999. Final report: a DACST Innovation Fund Project. *In* Branche, C., Beeck, E, Van., (2006) Task Force on the Epidemiology of Drowning (2006) pp 63 - 64.

Pitman, S, J., Wright, M., Hocken, R., (2018) An analysis of life jacket wear, environmental factors, and casualty activity on marine accident fatality rates, *Safety Science*, [online] https://doi.org/10.1016/j.ssci.2018.07.016 [accessed 10th December 2021].

Quistberg, D, A., Bennett, E., Quan, L., Ebel, B, E., (2014) Low life jacket use among adult recreational boaters: A qualitative study of risk perception and behaviour factors. *Accident Analysis and Prevention* 62 (2014) pp 276-284)

Royal Life Saving Society (RLSS) (1998) *Life Guard Training Manual*. USA: Mosby Lifeline.

RNLI (2005) Which lifejacket for you? *In* (2006) Marine Accident Investigation Branch (MAIB) Lifejackets Review. [online] www.gov.uk/maib [accessed March 10th 2022].

RNLI (2021) Lifeboat magazine. *United Nations resolution on drowning prevention*. Summer 2021, Issue 636.

Ross, S, R., Irwin, C, C., Irwin, R, L., Martin, N, T., Ryan, T, D., (2014) The development of Swimming Skills for African American Youth: Parent and Caregiver Perceptions of Barriers and Motivations. *International Journal of Aquatic Research and Education*, 2014, 8, pp 219-239

Smith, M, D., Wilen, J, E., (2005) Heterogeneous and Correlated Risk Preferences in Commercial Fishermen: *The Perfect Storm* Dilemma. *The Journal of Risk and Uncertainty*, Vol 31 (1) pp 53-71

Whitworth, H, S., Pando, J., Hansen, C., Howard, N., Moshi, A., Rocky, O., Mahanga, H., Jabbar, M., Ayieko, P., Kapiga, S., Grosskurth, H., Watson-Jones, D., (2019) Drowning among fishing communities on the Tanzanian shore of Lake Victoria: a mixed-methods study to examine incidence, risk factors and socioeconomic impact. Whitworth H, S., *et al*. BMJ Open 2019;9:e032428.

Wight, C., (2004). Understanding the Role of Theory. *Writing Your Master's Thesis*. United Kingdom: Studymates Ltd.

Wisker, G., (2008) The Postgraduate Research Handbook. *Palgrave Study Guide*. 2nd edition. London: Palgrave Macmillan.

World Health Organization (WHO) (2014) Global report on drowning: preventing a leading killer. [online] http://www.who.int/publications/i/item/global-report-on-drowning-prevention-a-leading-killer [accessed 6th January 2021].

World Health Organisation (WHO) (2017), Drowning fact sheet, [online] http://www.who.int/mediacentre/factsheets/fs347/en/ [accessed 19th November 2020]

World Health Organization (WHO). (2018) Drowning: Available online: https://www.who.int/en/news-room/fact-sheets/detail/drowning [accessed 12th October 2020]

Yonazi, E., (2016) AfDB approves US $25 million for project to make Lake Victoria safe for fisheries and transportation. [on line] https://www.afdb.org/en/news-and-events/afdb-approves-us-25-million-for-project-to-make-lake-victoria-safe-for-fisheries-and-transportation-16269 [accessed April 15th 2021]

8.1 Bibliography

Avramidis, S., Butterly, R., Llewellyn, D., (2009) Where do people drown? Encoding the Third Component of the 4W Model. *International Journal of Aquatic Research and Education.* Vol 3 No 3 Article 4 pp 236-254

BBC (2018) Lake Victoria ferry disasters, MV Nyerere and MV Bukoba [on line] www.bbc.co.uk/news/world-africa-45611436 [accessed 13th September 2021]

Branche, C., Beeck, E, Van., (2006) Task Force on the Epidemiology of Drowning. *World Congress on Drowning*. (2006) pp 63 - 64.

Clark, I., (2021) *Uganda, The essential guide to customs and culture*. London: Kuperand. pp 68 - 111

Garcia, J, R., (2011) *Numerical study of dynamic relaxation methods and contribution to the modelling of inflatable life jackets.* Thesis. University de Bretagne. https://tel.archives-ouvertes.fr/tel-00659669.

Hammersley, M., (1992) *What is wrong with Ethnography? Deconstructing the Qualitative – Quantitative Divide.* USA & Canada: Routledge. pp 159-174

Huang, X., New Design for Life Jackets using Smart Plastic. *International Conference on Industrial Technology and Management Science* (2015) pp 1690 – 1692

Juma, D, W., Wang, H., Li, Fengting (2014) Impacts of population and economic development on water quality of a lake: case study of Lake Victoria Kenya water. *Environmental Science and Pollution Research* (2014) 21 pp 5737-5746

Martin, S., Namayandeg, M, H., (2017) Desirability in design for safety: Developing life jacket through creative problem solving method of TRIZ. *The Design Journal* Vol 20 (1) Proceedings of the 12th European Academy of Design Conference, Sapienza, Rome.

Ntambi, D., (2020) The Truth About Superstition. *The Gospel Coalition* (TGC) African Edition. July 14th, 2020.

Pask, E, A., Christie, P, D., (1962) Design of Life-Jackets. *British Medical Journal*, pp 333-335.

Peden, A, E., Demant, D., Hagger, M, S., Hamilton, K., (2018) Personal, social, and environmental factors associated with life jacket wear in adults and children: A systematic literature review. *Plos One*, [online] https://doi.org/10.1371/journal.pone.0196421 [accessed 24th November 2021].

Phillips, E, M., Pugh, D, S., (2010) *How to get a PhD*, A handbook for students and their supervisors. Fifth edition, United Kingdom, Open University Press.

Pidgeon, S, M, W., Franklin, R, C., Leggat, P, A., Devine, S., (2019) Identifying a gap in drowning prevention: high-risk populations. *Injury Prevention* 26 (3) Australia: BMJ Journals. pp 279-288.

Pointer, K., Milligan, G, S., Garratt, K, L., Clark, S, P., Tipton, M, J., (2018) A 10-year descriptive analysis of UK Maritime and Coastguard on life jacket use and drowning prevention. A study by the Casualty Review Panel, for the University of Portsmouth.

Ramos, W., Beale, A., Chambers, P., Dalke, S., Fielding, R., Kublick, L., Langendorfer, S., Lees, T., Quan, L., Wernicki, P., (2015) Primary and Secondary Drowning Interventions: The American Red Cross Circle of Drowning Prevention and Chain of Drowning Survival. *International Journal of Aquatic Research and Education*. V9 No 1 Article 8.

SOLAS (2018) Requirements for life jackets [online] www.cirspb.ru/en/blog/info-isa/lifejacket [accessed 7th November 2020]

9.0 Appendices

Appendix A

Bournemouth University

Research Ethics Checklist

About Your Checklist	
Ethics ID	34479
Date Created	15/11/2020 13:55:06
Status	Approved
Date Approved	04/01/2021 11:41:18
Date Submitted	29/12/2020 15:51:04
Risk	High

Researcher Details	
Name	Bob Mills
Faculty	Faculty of Science & Technology
Status	Postgraduate Research (MRes, MPhil, PhD, DProf, EngD, EdD)
Course	Postgraduate Research - FST
Have you received funding to support this research project?	No
Please list any persons or institutions that you will be conducting joint research with, both internal to BU as well as external collaborators.	N/A

Project Details	
Title	Drownings in Ugandan waters of Lake Victoria: Research into reducing fatalities through the use of personal flotation aids.
Start Date of Project	21/09/2020
End Date of Project	24/03/2022
Proposed Start Date of Data Collection	04/01/2021
Original Supervisor	Ben Thomas
Approver	Research Ethics Panel

Summary - no more than 500 words (including detail on background methodology, sample, outcomes, etc.)

The aim of this research project is to review the reasons why there are high instances of drowning in Ugandan waters of Lake Victoria (a low middle income country), and to propose recommendations that reduces fatalities using principles of design and innovation research procedures. This research project is a continuation from my previous research thesis. (Mills 2020). As a commercial endorsed yacht master, I have a responsible interest in the health and safety of people who use water as a means of transport, leisure or fishing. With approximately 350,000 people (WHO 2018) drowning each year, it is a world wide problem that needs addressing.

A comprehensive literature review will aim to determine the extent of the problem, the reasons underlying the problem and if there is a gap in knowledge and understanding. I will be looking for peer reviewed up-to-date research information, and any thing that could potentially add to existing knowledge.

Methodology will be based on grounded theory and principles. Before a questionnaire can be piloted, a brainstorming secession with a group of academics will help to define the research question, and narrow the scope of research. Brainstorming is good for stimulating creative and imaginative ideas. When a draft copy of the questionnaire is completed, and approved by my supervisors, copies will be trialled via a pilot study. Results will dictate any alterations that are needed. A second pilot study will confirm approval that the questionnaire is suitable for email distribution or face-to-face research. Data analysis will depend on the quality and quantity of that data. Before commencement participants will be asked to read a participant information sheet and read and sign a participant agreement form. The questionnaire will consist of open and closed questions, but it is not expected that participants will be able to answer all the questions. All interviews will be recorded via a Dictaphone providing participants are in agreement. Recordings will be deleted once transcribed. All transcriptions will be stored securely on Bournemouth University 'H' drive.

Data analysis and outcome will be dependant on the quality and quantity of the collected data. Participant involvement in the email interviews could be problematic, in which case focus groups are another option of research if time allows.

References

Mills, R, C., (2020) Life Jackets: Perception of Usability. Bournemouth University. MSc Thesis.

World Health Organization (WHO). (2018) Drowning: Available online: https://www.who.int/en/news-room/fact-sheets/detail/drowning [accessed 12th October 2020]

Filter Question: Does your study involve Human Participants?

Participants
Describe the number of participants and specify any inclusion/exclusion criteria to be used
Face-to-face interviews is the main choice of the researcher. 15-18 participants would be required to take part. Interviews will be recorded, transcribed and coded. If government restrictions on covid-19 prevents face-to-face interviews, as a second choice, online video links 'Zoom' or Micro-soft 'Teams' would be used for the interviews.

Do your participants include minors (under 16)?	No
Are your participants considered adults who are competent to give consent but considered vulnerable?	No
Is a Disclosure and Barring Service (DBS) check required for the research activity?	No

Recruitment
Please provide details on intended recruitment methods, include copies of any advertisements.
Recruiting participants would be contacted by e-mail for acceptance before starting the interview procedure. The researcher is prepared to travel to locations specified by participants for the interviews. All potential participants are known to the researcher. All have sailed with the researcher over many years, with the majority belonging to the same yacht club. All participants live either in the London area or South and South west of England. All have been employed in professional occupations.

Do you need a Gatekeeper to access your participants?	No

Data Collection Activity	
Will the research involve questionnaire/online survey? If yes, don't forget to attach a copy of the questionnaire/survey or sample of questions.	Yes

How do you intend to distribute the questionnaire?	
face to face,online	
If online, do you intend to use a survey company to host and collect responses?	No
Will the research involve interviews? If Yes, don't forget to attach a copy of the interview questions or sample of questions	Yes
Please provide details e.g. where will the interviews take place. Will you be conducting the interviews or someone else?	
Interviews will be conducted either in the participants homes, on a boat or a place of their choice. Each interview will be recorded on a Dictaphone. The researcher (myself) will be asking the questions and taking notes. All recordings will coded and transcribed with the transcriptions stored on Bournemouth University 'H' drive. Once transcribed each recording will be deleted. If the interviews are to be held on-line, the tools that will be used are a Dictaphone and a personal computer. The computer will not be used for the recordings.	
Will the research involve a focus group? If yes, don't forget to attach a copy of the focus group questions or sample of questions.	No
Will the research involve the collection of audio materials?	Yes
Will your research involve the collection of photographic materials?	No
Will your research involve the collection of video materials/film?	No
Will any audio recordings (or non-anonymised transcript), photographs, video recordings or film be used in any outputs or otherwise made publicly available?	No
Will the study involve discussions of sensitive topics (e.g. sexual activity, drug use, criminal activity)?	No
Will any drugs, placebos or other substances (e.g. food substances, vitamins) be administered to the participants?	No
Will the study involve invasive, intrusive or potential harmful procedures of any kind?	No
Could your research induce psychological stress or anxiety, cause harm or have negative consequences for the participants or researchers (beyond the risks encountered in normal life)?	No
Will your research involve prolonged or repetitive testing?	No

Consent	
Describe the process that you will be using to obtain valid consent for participation in the research activities. If consent is not to be obtained explain why.	
A non-binding consent will be requested via e-mail or phone conversation before arranging interviews. Before starting any interviews, consent will be required via a participant information sheet and a participant agreement form.	
Do your participants include adults who lack/may lack capacity to give consent (at any point in the study)?	No
Will it be necessary for participants to take part in your study without their knowledge and consent?	No

Participant Withdrawal	
At what point and how will it be possible for participants to exercise their rights to withdraw from the study?	Participants have the right to withdraw any time they like. As per the information supplied in the participant information sheet.
If a participant withdraws from the study,	If participants withdraw before their data collection is completed, the existing data will

what will be done with their data?	be destroyed. All completed data will be kept for one year in accordance with Bournemouth University retention period set out in the research Ethics Code of Practice.

Participant Compensation	
Will participants receive financial compensation (or course credits) for their participation?	No
Will financial or other inducements (other than reasonable expenses) be offered to participants?	No

Research Data	
Will identifiable personal information be collected, i.e. at an individualised level in a form that identifies or could enable identification of the participant?	Yes
Please give details of the types of information to be collected, e.g. personal characteristics, education, work role, opinions or experiences	
It is possible that some one could recognize a participants voice from a recording. Each recording once transcribed and coded will be deleted. There will be no written details of any participants as each set of answers will be coded. All transcripts will be stored on Bournemouth University 'H' drive. Personal information consists of gender, age group and any involvement in rescue situations. Plus questions relating to sailing/boating experience, size of boats, for how long each year, etc. Questions will also be asked on the wearing of life jackets, the main topic of the questionnaire. Also what they think about life jackets in relation to different types, legislation proposals, standards for non-European countries, cost, and participants ideas on design.	
Will the personal data collected include any special category data, or any information about actual or alleged criminal activity or criminal convictions which are not already in the public domain?	No
Will the information be anonymised/de-identified at any stage during the study?	Yes
Will research outputs include any identifiable personal information i.e. data at an individualised level in a form which identifies or could enable identification of the individual?	No

Storage, Access and Disposal of Research Data	
During the study, what data relating to the participants will be stored and where?	All recordings will be deleted once transcribed and coded. Transcriptions will be stored on the Bournemouth University 'H' drive. Anonymised data will be stored for a period of 3-5 years.
How long will the data relating to participants be stored?	Anonymised data will be stored for a period of 3-5 years.
During the study, who will have access to the data relating to participants?	Myself the researcher.
After the study has finished, what data relating to participants will be stored and where? Please indicate whether data will be retained in identifiable form.	Coded transcriptions and anonymised data will be held on Bournemouth Universities 'H' drive for a maximum period of between 3-5 years.
After the study has finished, how long will data relating to participants be stored?	A period of between 3-5 years.
After the study has finished, who will have access to the data relating to participants?	The researcher, supervisors, and altherised university staff.
Will any identifiable participant data be	No

transferred outside of the European Economic Area (EEA)?	
How and when will the data relating to participants be deleted/destroyed?	Anonymised data will be kept for a period of 3-5 years.
Once your project completes, will any anonymised research data be stored on BU's Online Research Data Repository "BORDaR"?	Yes

Dissemination Plans	
Will you inform participants of the results?	Yes
If Yes or No, please give details of how you will inform participants or justify if not doing so	
If requested, I will inform participants of what was recommended for improving the design of life jackets or floatation aids. I will not inform them of any personal information from any individual's that took part in the research, including interview participants.	

Final Review	
Are there any other ethical considerations relating to your project which have not been covered above?	No

Risk Assessment	
Have you undertaken an appropriate Risk Assessment?	Yes

Filter Question: Will your research study take place outside the UK and/or specifically target a country outside the UK?

Additional Details	
What country will your research take place in? Please include details and measures taken to minimise risks.	Research is based on drownings in low middle income countries. I will concentrate on Uganda and the waters of Lake Victoria, as they have a high concentration of drownings. To include other countries would require a larger scope of research. All research and interviews will be carried out in the United Kingdom.
Does the country in which you are conducting research require that you obtain internal ethical approval (other than BU ethical approval)?	No

Attached documents
Interview Questions.docx - attached on 29/12/2020 15:50:15
Participant Agreement Form.docx - attached on 29/12/2020 15:50:23
Participant Information Sheet.docx - attached on 29/12/2020 15:50:30

Appendix B

Bournemouth University

Ref & Version: 1

Ethics ID number: 34479

Date: 5th Jan 2021

Participant Information Sheet

Research Project Title: Drownings in Ugandan waters of Lake Victoria: Research into reducing fatalities through the use of personal floatation aids.

What is the purpose of the project?

The aim of the research is to evaluate collected data via structured interviews, analyse the data and develop design recommendations to address issues concerning drowning prevention, and the preservation of life. The research will take place over a period of 4-5 months between February 2021 and June 2021 and is expected to conclude March 2022.

Why have I been chosen?

Potential participants have been chosen for their sailing experience, and knowledge of boats and the sea. Those selected, will be informed of any risks involved before commencement of interviews. Participants, who are willing to take part in this project, should be ideally aged 18+ years or older with no upper age limit. The number of participants expected to take part will be determined by the amount of data collected. Due to time restraints, I will be looking to recruit 13 – 16 participants.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to read. You can withdraw from participation at any time and without giving a reason, simply by contacting the researcher Robert Mills. The researcher will then destroy any personal information/recordings/transcriptions relating to the individual concerned. Please note that once you have completed and submitted your interview responses, we are unable to remove your anonymised responses from the study.

What would taking part involve?

The duration of each individual Interview is expected to last approximately 30-45 minutes. Data collection will be via Dictaphone and the taking of notes by the interviewer. The interview will be audio recorded then transcribed. The participant/interviewee can ask for a copy of the transcript when completed. Individual interviews will take place at an agreed time convenient for both parties and will take place depending on participant's requirements. Suggested places include: the participants residence, the interviewer's residence, or any place deemed suitable (Government Covid-19 restrictions permitting). Participants will be asked a set of questions relating to their experiences with life jackets, rescue attempts, life jacket beliefs, legislation, and life jacket design suitable for low middle income countries.

During the course of the interview participants will also be asked if they have any additional questions, ideas, or examples they wish to refer to. The structured questions will be mixture of open-ended, and closed questions. Comments and opinions will be recorded, transcribed, and coded. Statistical analysis will take place when all the interviews are completed.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this report and their participation will highlight any difficulties or possible improvements to life jacket design. A risk assessment has been carried out to evaluate potential risks to participants. Government Covid-19 restrictions will be adhered to at all times. Interviews will be conducted face-to-face or via an online 'zoom' link. The risk assessment established there was no risk to participants or those involved in the research process.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

Research into the design of life jackets/floatation aids requires user information supplied by voluntary participants for the purpose of evaluation. Participants provide a rich source of valuable information with their individual sailing/boating experiences and subject knowledge. Any new contribution to existing knowledge could ultimately identify flaws in current designs and help to address the problem. Valuable data will give the researcher a clearer understanding in achieving the research project's objective.

Use of my information

Participation in this research project is on the basis of consent: you do not have to complete the interview, and you can change your mind at any point before submitting the interview responses. Once we receive your interview response, your personal information is processed

in compliance with the data protection legislation. We will use your data on the basis that it is necessary for the conduct of research, which is an activity in the public interest.

Bournemouth University (BU) is a Data Controller of your information which means that we are responsible for looking after your information and using it appropriately. BU's Research Participant Privacy Notice sets out more information about how we fulfil our responsibilities as a data controller and about your rights as an individual under the data protection legislation. We ask you to read this Notice so that you can fully understand the basis on which we will process your information.

Once you have submitted your interview response it may not be possible for us to remove it from the study analysis, as this might affect our ability to complete the research appropriately or the accuracy and reliability of the research findings.

As well as BU staff [and the BU student(s)] working on the research project, we may also need to share personal information in a non-anonymised form with third parties e.g., external organisation(s) such as external collaborators, transcription services and funders.

The information collected about you may be used in an anonymous form to support other research projects in the future and access to it in this form will not be restricted. It will not be possible for you to be identified from this data. All anonymised data collected for the purposes of this study will be held for a period of 3-5 years, from the date of publication of the research or one year after the award of the degree. Although published research outputs are anonymised, we need to retain underlying data collected for the study in a non-anonymised form for a certain period to enable the research to be audited and/or to enable the research findings to be verified.

Contact for further information

If you have any questions or would like further information, please contact the researcher Robert Mills via e-mail s4923844@bournemouth.ac.uk or e-mail the research supervisors Dr Ben Thomas thomasb@bournemouth.ac.uk or Dr Philip Sewell psewell@bournemouth.ac.uk

In case of complaints

Any concerns about the study should be directed to the project researcher Robert Mills. If your concerns have not been answered by Robert Mills or one of the project supervisor's Dr Ben Thomas or Dr Philip Sewell you should contact Professor Tiantian Zhang, the Deputy Dean of Research and Professional Practice in the Faculty of Science and technology, Bournemouth University by email to researchgovernance@bournemouth.ac.uk.

Appendix C

Ref & Version: 1
Ethics ID number: 34479
Date: 5th Jan 2021

Participant Agreement Form

Full title of project: Drownings in Ugandan waters of Lake Victoria: Research into reducing fatalities through the use of personal floatation aids.

Name, position, and contact details of researcher:

Robert Mills, postgraduate research student, s4923844@bournemouth.ac.uk

Name, position, and contact details of supervisors:

Dr Ben Thomas, supervisor, thomasb@bournemouth.ac.uk

Dr Philip Sewell, supervisor, psewell@bournemouth.ac.uk

To be completed prior to data collection activity

Section A: Agreement to participate in the research project

You should only agree to participate in the research project if you agree with all of the statements in this table and accept that participating will involve the listed activities.

I have read and understood the Participant Information Sheet for the above research project.
I confirm that I have had an opportunity to ask questions.
I understand that my participation is voluntary.
I understand that I am free to withdraw up to the point where the data are processed and become anonymous, so my identity cannot be determined.
During the interview, I am free to withdraw without giving reason and without there being any negative consequence.
Should I not wish to answer any particular question(s) I am free to decline.
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the outputs that result from the research.

I understand taking part in the research will include being recorded (audio) but that these recordings will be deleted once transcribed.
I agree to take part in the above research project.

	Initial box to agree
I consent to take part in the research project on the basis set out above (Section A)	

I confirm my agreement to take part in the research project on the basis set out above.

Name of participant *(BLOCK CAPITALS)*	*Date* *(dd/mm/yyyy)*	Signature
Name of researcher *Robert Mills*	*Date* *(dd/mm/yyyy)*	Signature

..

Appendix D

Life Jackets and LMICs

Preamble

Interview Questions

As part of my post graduate research, I am interested in how you feel about the wearing of life jackets in UK/Europe and Low Middle Income Countries (LMICs). In particular their design, and perception of use. I wish to ask you a series of open and closed structured questions via this question sheet. Anticipated time to complete the interview will be approximately 30 – 45 minutes. This interview will be recorded, with all identifiable data deleted after transcription or analysis. Your answers will remain confidential and in line with the university's ethical guidelines.

Please rate the following responses on a scale of 1 – 5

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

Personal information

1. What is your gender? (Male) (Female) (Other)

2. What is your age group? (18 – 39) (40 – 59) (60 – 79) (80+)

3. Have you ever been involved in a rescue situation? Yes/No

Sailing experience

4. How many years boating/sailing experience do you have? Years.....

5. What size boats do you generally go on? .....

6. Besides UK/European waters, where else have you gone boating/sailing? .....

7. On average, how many days a year do you normally go boating/sailing? .....

8. Do you normally skipper boats/yachts? Yes/No/Sometimes

The wearing of life jackets

9. If a life jacket were made available would you wear one? Yes/No/Sometimes

10. (a) Would you always encourage crew members to wear a life jacket? Yes/No/Sometimes

10. (b) Please provide a reason for your response

---

11. Wearing of life jackets should be mandatory? (1) (2) (3) (4) (5)

12. Buying a life jacket, you would buy the cheapest 'basic' one? (1) (2) (3) (4) (5)

13. If money were not an issue, what type of life jacket would you purchase and why?

---

14 (a). If you were offered a Manual-inflating life jacket as the only option, would you wear one? Yes/No/Sometimes

14 (b). Please provide a reason for your response.

Beliefs

15. Life jacket users are perceived as being novices or non-swimmers (1) (2) (3) (4) (5)

16. You think cultural beliefs influence decisions in life jacket use. (1) (2) (3) (4) (5)

17. Peer pressure is a deciding factor in non-use. (1) (2) (3) (4) (5)

18. Cheaper ‘basic’ life jackets might encourage use. (1) (2) (3) (4) (5)

Legislation and Proposals

19. The consumption of alcohol should be banned on vessels. (1) (2) (3) (4) (5)

20. Life jackets should be government subsidised to encourage use. (1) (2) (3) (4) (5)

21. Fishing communities should have a designated safety representative. (1) (2) (3) (4) (5)

22. All boat operators and skippers should have a licence to operate. (1) (2) (3) (4) (5)

23. The wearing of life jackets for children should be mandatory. (1) (2) (3) (4) (5)

Life Jackets and Low Middle Income Countries (LMICs)

24. What do you feel about promoting European-standard life jackets for use in LMICs.

---

25. What do you think about the supplying of passenger aircraft-style life jackets for LMICs?

---

26. What do you think about relaxing life jacket standards to make them more accessible to LMICs?

---

27. What do you think the likely reason would be for not wanting to wear a life jacket?

---

28. Can you make any suggestions to reduce drowning events in these areas?

---

29. What life jacket safety features do you consider as essential?

---

30. Is there anything else you would like to add?

Appendix E

(Fig 5 & 6) Commercial Aircraft Life Jacket. A ‘Beaufort Mk.10N’ before and after inflation.

(Fig 7 & 8) A standard 150N ‘Ocean Passage’ Life Jacket before and after inflation