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Lifejacket wear and the associated factors among boaters involved in occupational boating activities on Lake Albert, Uganda: a cross-sectional survey

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ABSTRACT

Background Drowning death rates in lakeside fishing communities in Uganda are the highest recorded globally. Over 95% of people who drowned from a boating activity in Uganda were not wearing a lifejacket. This study describes the prevalence of lifejacket wear and associated factors among boaters involved in occupational boating activities on Lake Albert, Uganda.

Methods We conducted a cross-sectional survey, grounded on etic epistemology and a positivist ontological paradigm. We interviewed 1343 boaters across 18 landing sites on Lake Albert, Uganda. Lifejacket wear was assessed through observation as boaters disembarked from their boats and self-reported wear for those who 'always wore a life jacket while on the lake'. We used a mixed-effects multilevel Poisson regression, with landing site-specific random intercepts to elicit associations with lifejacket wear. We report adjusted prevalence ratios (PRs) at 95% confidence intervals.

Results The majority of respondents were male, 99.6% (1338/1343), and the largest proportion, 38.4% (516/1343) was aged 20–29 years. Observed lifejacket wear was 0.7% (10/1343). However, self-reported wear was 31.9% (428/1343). Tertiary-level education (adjusted PR 1.57, 95% CI 1.29- 1.91), boat occupancy of at least four people (adjusted PR 2.12, 95% CI 1.28 - 3.52), big boat size (adjusted PR 1.55, 95% CI 1.13 - 2.12) and attending a lifejacket-use training session (adjusted PR 1.25, 95% CI 1.01 - 1.56) were associated with higher prevalence of self-reported lifejacket wear. Self-reported wear was lower among the 30–39 year-olds compared to those who were aged less than 20 years (adjusted PR 0.66, 95% CI 0.45 - 0.99).

Conclusion Lifejacket wear was low. Training on lifejacket use may improve wear among boaters involved in occupational boating activities on Lake Albert.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Factors associated with lifejacket wear among leisure boaters in high-income countries are known. There is no evidence as to whether these factors are generalisable to boaters involved in occupational boating activities in rural low-income settings.
⇒ Lakeside fishing communities in Uganda are among the most affected globally. The majority of those who drown from boating activities are not wearing lifejackets.

WHAT THIS STUDY ADDS

⇒ This study estimates the prevalence of lifejacket wear and the associated factors among the boaters involved in occupational boating activities on one of the major lakes in Uganda.
⇒ This study identifies potential interventions that may improve lifejacket wear among boaters involved in occupational boating activities in Uganda.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

⇒ This study does not have a direct influence on research, practice and policy in Uganda. However, it provides an understanding of the current state of lifejacket wear and the associated factors among the communities known to be the most at risk of drowning. This information may be used to inform government efforts to improve the safety of water transport as a contribution toward achieving the country's Vision 2040. Indeed, Lake Albert is one of the major lakes in Uganda that is known for frequent drowning incidents. The findings of this study may be used as a basis to develop, pilot and scale up interventions aimed at improving the safety of water transport on Lake Albert in Western Uganda.

BACKGROUND

Drowning accounts for 7% of the global burden of injury deaths, and people with frequent exposure to water such as boating have an increased risk.[1] Over the last decade, the estimated number of unintentional drowning deaths has slowly decreased from 372 000 in 2012[2] to 236 000 in 2020.[3] Low and middle-income countries (LMICs) suffer the world's highest drowning death rates and continue to bear over 90% of the burden.[2 4] Although Africa has the least data on drowning, the WHO estimates that the region is among the most affected, with death rates at 8 per 100 000 population.[2 3] Unfortunately, these global estimates exclude drownings from water transportation and flood disasters which are frequent in Africa and many other LMICs. Drowning death rates in

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lakeside fishing communities in Uganda are the highest recorded globally, estimated at 502 per 100 000 population.[5]

Risk factors for drowning are categorised as modifiable (can be changed) and non-modifiable. Modifiable risk factors include inconsistent lifejacket wear, frequent exposure to water and the seaworthiness of watercraft, while the non-modifiable risk factors include age, sex and weather.[4 6] Lifejackets are above 80% effective in preventing drowning deaths.[7–9] Despite this high effectiveness, lifejacket wear is chronically low, both in high-income countries (HICs) and LMICs. Over 80% of the people who drown from leisure boating activities do not wear life jackets.[5 10 11] In Uganda, 95% of people who drowned from boating activities were not wearing a lifejacket. In Lake Victoria fishing communities, lifejacket wear ranges from 2% on the Tanzanian side to 26% in Uganda.[12 13] Little is known about the communities around Lake Albert in Western Uganda that have different sociocultural characteristics.

In HICs, low lifejacket wear is driven by a perceived low risk of drowning, perceived strong swimming ability and discomfort. Factors associated with increased lifejacket wear include female gender, boat type (non-motorised), boat size (small) and role modelling.[4 14] In Uganda, the majority of people who frequently access water are young adults involved in occupational boating activities of fishing, transportation and other economic activities.[12 15 16] Safety practices are left to individual decisions due to limited national legislation and enforcement. Moreover, findings from leisure boating activities in HICs cannot be generalised to occupational boating activities in rural low-resource settings. This study estimates the prevalence of lifejacket wear and the associated factors among boaters involved in occupational boating activities on Lake Albert, Western Uganda, as part of the preliminary studies to inform the development of appropriate interventions.

METHODOLOGY

Study design and setting

We conducted a cross-sectional survey along the shorelines (landing sites) of Lake Albert in Western Uganda. To objectively measure the outcome of interest, we grounded our study on etic epistemology and a positivist ontological paradigm.[17] Lake Albert is Africa's seventh largest freshwater body, located at the border between Uganda and the Democratic Republic of Congo.[18] According to the National Fisheries Resources Research Institute and Uganda Police Marines, there are over 70 landing sites on the Ugandan side but only about half are gazetted. However, due to the rising lake water levels, many had been flooded and vacated, leaving only 18 accessible and occupied at the time of this study. The landing sites, used for embarking and disembarking, are spread across five districts: Kikuube, Hoima, Ntoroko, Buliisa and Pakwach. The inhabitants of the landing sites mainly speak Alur, Runyooro, Rutooro and Lugungu. Apart from the Alur speakers who are from the Luo ethnic group, the other languages belong to the same ethnic group, locally known as Banyakitara, and have similar sociocultural characteristics. The lake supports the local livelihoods of about 4 million people on the Ugandan side who mainly depend on fishing and water transportation businesses.[19]

Study participants

The study was conducted among boaters involved in occupational boating activities on Lake Albert, Uganda. We defined occupational boaters to include fishermen and transporters who use boats or canoes, seafarers, coxswains and boat crew (collectively referred to as boaters in this study). From the leadership of Lake Albert Boat Owners' Association, the number of boaters on the landing sites ranges from 150 to 370. We included boaters who had worked for at least 1 month at the time of the interview. We chose this period because we believed that it was a long enough experience with water to identify associated risks. We excluded boat passengers because of the different exposure risks which are not comparable to those of the occupational boaters who are on the water daily. The occupational boaters spend an average of 12 hours on the lake daily.

Sample size determination

We determined the sample size using the Leslie Kish formula.[20] We considered the following assumptions: a standard normal deviate $Z\alpha=1.96$; estimated prevalence of lifejacket use, 26% from a previous study in Uganda[12] and a 3% precision. We inflated our sample with assumptions of 10% non-response and a design effect (DE) of 1.5 to cater for clustering. This DE has been used and recommended in multiple indicator cluster surveys (MICS).[21] These assumptions yielded a final sample size of 1355 boaters.

Sampling procedures

We included the 18 gazetted landing sites (figure 1) that were functional at the time of this study. From each landing site, an estimated population of boaters was obtained from the landing site leadership. Because the landing sites had different population sizes, we employed proportionate-to-population size sampling to obtain the required number of boaters per site. Study participants disembarking from their boats were interviewed consecutively from 07:00 to 13:00 daily until the required number was obtained from each landing site.

Data collection

We collected data using a structured questionnaire programmed in open data kit (ODK) software installed on tablets. The questionnaire development was informed by a synthesis of literature on factors influencing lifejacket use in LMICs, tools from previous studies[12 13 15 16] and local knowledge about the community. The questionnaire was pretested at Ggaba landing site on Lake Victoria, and the necessary revisions were made. A Cronbach's alpha of 0.62 was calculated, indicating an acceptable level of internal consistency reliability[22] of the items in the questionnaire. Data collection focused on the domains of sociodemographics, use of life jackets, experience with water, boat ownership and other variables in the behaviour change of the capability, opportunities and motivation for behavior change (COM-B) model of the behavior-change wheel.[23]

We categorised boat sizes as small (<3 meters long) and big (≥3 meters long) as defined by the Uganda Inland Water Transport Act 2021.[24] Lifejacket wear was measured through observation as the boaters disembarked from their boats, as well as self-reported wear. Self-reported lifejacket wear was measured as a binary variable; boaters who 'always wore a life jacket while on the lake' were considered to have self-reported lifejacket wear and were assigned to the 'yes' category and the rest to the 'no' category.

Data management and analysis

We ensured data quality using plausible ranges pre-programmed into the electronic questionnaire. We imported the dataset into Stata V.15 software for further cleaning and analysis. Exploratory analyses were conducted to assess for outliers and suspect

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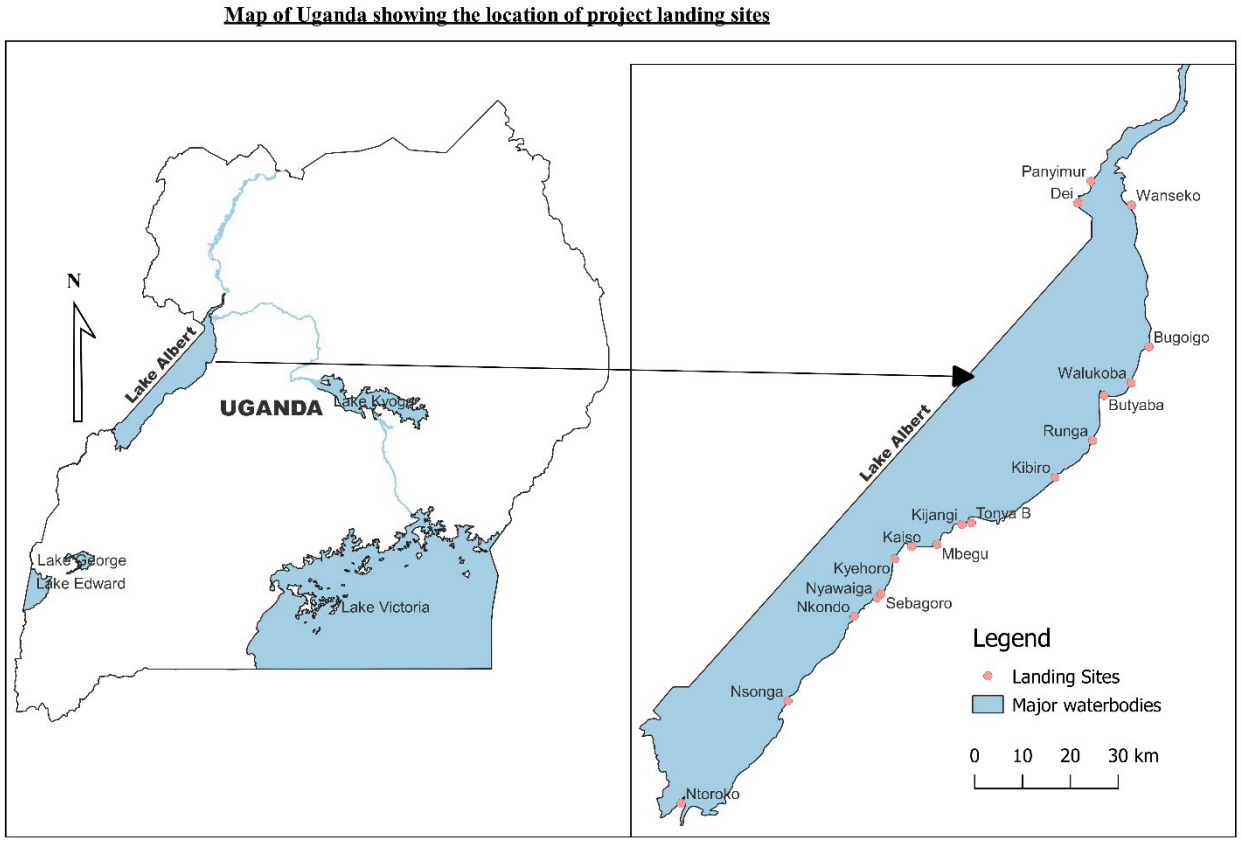

Figure 1 Map of Uganda showing the location of project landing sites.

entries. Observed and self-reported lifejacket wear are presented as counts and percentages. Due to the small number of observed lifejacket wear, we were unable to perform analysis beyond descriptive. Therefore, we used self-reported lifejacket wear for further analyses. We used a mixed-effects Poisson regression with landing site-specific random intercepts to elicit associations between self-reported lifejacket wear and the independent variables. The mixed-effects Poisson regression that contains both fixed and random effects was considered appropriate because it allows for modelling intra-cluster correlation. We report prevalence ratios (PRs) as opposed to odds ratios (ORs) to reduce statistical noise because the prevalence of self-reported lifejacket wear was above 10%.[25] We assessed multicollinearity among the independent variables using variance inflation factors (VIFs); none of the VIFs was greater than 5, suggesting absence of multicollinearity.[26]

Before performing multilevel analyses, we ran a null model to calculate the intra-cluster correlation coefficient (ICC), which reflects the proportion of total variance in lifejacket wear outcome explained by landing site. An ICC value of 0.129 was obtained, suggesting that a large amount of variation was accounted for by the landing site,[27 28] thus justifying the use of multilevel analysis. We employed the logical model building procedure where all variables that met the 0.2 level of significance at bivariable analysis, as well as those that were not statistically significant but important in literature as known/potential confounders, were included in the multiple regression model. The goodness of fit (GOF) of the model was assessed using the Hosmer-Lemeshow (HL) test. The HL GOF was chosen because it has an asymptotic χ^2 distribution for many generalised linear models in the exponential dispersion family, to which the Poisson model belongs.[29]

We report crude and adjusted PRs at 95% CIs. A level of 5% with two-tailed test was used to signify statistical significance.

RESULTS

The response rate was high, 99% (1343/1355), with the majority of the respondents being male, 99.6% (1338/1343) and the largest proportion, 38.4% (516/1343) aged 20–29 years. Fishermen constituted the majority, 89.9% (1207/1343) of the sample. The majority, 70.2% (943/1343) had attained secondary school education, while a few. 1.7% (23/1343) had tertiary-level education. A summary of the sociodemographic characteristics is given in table 1.

Lifejacket wear among the boaters on lake Albert Uganda

Out of the 1343 boaters who participated in this study, only 10 (0.7%) were observed wearing lifejackets. However, 42.4% (570/1343) reported having a lifejacket and only 31.9% (428/1343) reported always wearing a lifejacket while on the lake (table 2).

Factors associated with reported lifejacket wear among the boaters on Lake Albert, Uganda

Several factors were significantly associated with self-reported lifejacket wear at bivariable analysis. The prevalence of lifejacket wear was higher among boaters who had a household weekly expenditure of above 200 000/− (approx. US$57) compared with those who spent less than 50 000/− (approx. US$14) (unadjusted PR=1.86, 95% CI 1.31 - 2.65). Boat occupancy of at least four people had over a twofold prevalence of lifejacket wear compared with that of two people (unadjusted PR=2.64,

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Table 1 Sociodemographic characteristics of boaters on Lake Albert, Uganda

Variable		Frequency	Per cent
District where landing site is located	Buliisa	296	22.0
	Hoima	381	28.4
	Kikuube	386	28.7
	Ntoroko	86	6.4
	Pakwach	194	14.4
Sex	Female	05	0.4
	Male	1338	99.6
Age (complete years)	Less than 20	31	2.3
	20–29	516	38.4
	30–39	439	32.7
	40–49	226	16.8
	50 and above	131	9.8
Ethnicity	Alur	913	68.0
	Mugungu	160	11.9
	Munyooro/Mutooro	135	10.1
	Other	135	10.1
Religion	Anglican	286	21.3
	Catholic	661	49.2
	Muslim	190	14.1
	Pentecostal	158	11.8
	Other	48	3.6
Education level reached	None	326	24.3
	Primary	51	3.8
	Secondary	943	70.2
	Tertiary/university	23	1.7
Marital status	Single	273	20.3
	Married/living with spouse	1070	79.7
Occupation	Transporter	136	10.1
	Fisherman	1207	89.9
Duration of occupation	At most 12 months	26	1.9
	More than 12 months	1317	98.1
Occupancy of the dwelling unit	Owned	603	44.9
	Rented	740	55.1
Boat ownership	Yes, owned	203	15.1
	Not owned	1140	84.9

Table 2 Prevalence of self-reported lifejacket wear by landing site on Lake Albert, Uganda

Landing site	Interviewed (n)	Users	%
Bugoigo	44	4	9.1
Butiaba	93	26	28.0
Dei	107	27	25.2
Kaiso	100	28	28.0
Kibiro	53	14	26.4
Kijangi	54	27	50.0
Kyehoro	81	15	18.5
Mbegu	56	14	25.0
Nkondo	61	34	55.7
Nsonga	78	26	33.3
Ntoroko	86	12	14.0
Nyawaiga	62	35	56.5
Panyimur	87	1	1.1
Runga	90	34	37.8
Sebagoro	104	64	61.5
Tonya-B	28	4	14.3
Walukoba	108	48	44.4
Wanseko	51	15	29.4

95%-CI 1.43 - 4.89). Lifejacket wear was higher if a big boat was used (unadjusted PR 1.46, 95% CI 1.07 - 2.00). Furthermore, people whose boats had provisions for storage of lifejackets (unadjusted PR=1.52, 95% CI 1.25 - 1.85) and those who had ever attended a training session on lifejacket use (unadjusted PR 1.37, 95% CI 1.12 - 1.68) had a higher prevalence of self-reported lifejacket wear.

At multivariable analysis, the HL GOF test gave a Pearson χ^2 p value of 0.98, indicating that the final model fit the data reasonably well. Tertiary-level education (adjusted PR 1.57, 95% CI 1.29 - 1.91) and attending a training session on lifejacket use (adjusted PR 1.25, 95% CI 1.01 - 1.56) were associated with a higher prevalence of lifejacket wear. The prevalence of lifejacket wear was higher when boat occupancy was four or more people (adjusted PR 2.12, 95% CI 1.28 - 3.52), when boat size was more than 3 meters in length (in this study referred to as big boat) (adjusted PR 1.55, 95% CI 1.13 - 2.12), and when the participant owned a boat (adjusted PR 1.44, 95% CI 1.14 to 1.83). However, relative to the boaters aged less than 20 years, the prevalence of lifejacket wear was significantly lower among people who were aged 30–39 years (adjusted PR 0.66, 95% CI 0.45 - 0.99). Taking intoxicating substances such as alcohol was associated with less lifejacket wear, although this was not significant. Self-reported lifejacket wear was lower among the boaters in the two districts at the extreme ends of Lake Albert (see figure 1): Ntoroko (adjusted PR 0.59, 95% CI 0.40 - 0.85) and Pakwach (adjusted PR 0.47, 95% CI 0.23 - 0.96) (table 3).

DISCUSSION

This study describes the prevalence of lifejacket wear and the associated factors among boaters involved in occupational boating activities on Lake Albert, Western Uganda. Males constituted the majority in our sample, which may indicate that fishing and transportation are largely dominated by men. This finding can be related to many studies that show the burden of drowning to be particularly high among men.[15 16 30] The results show that the largest proportion of boaters were young adults aged 20–39 years. Previous studies demonstrated that the majority of people who drown are under the age of 40 years.[12 13 15]

Observed lifejacket wear was less than 1%. However, self-reported wear was much higher. In a similar study among fishing communities on Lake Victoria, about two-thirds (67%) of the participants reported using a lifejacket at some point.[12] We cannot rule out social desirability bias from the self-reported lifejacket wear because the respondents may have mentioned what they thought the study team wanted to hear. Furthermore, the boaters may take off their lifejackets as they approach the landing, and therefore, our observation as they disembarked from their boats may have missed it. It should be noted that drowning can occur at any point on the lake regardless of the distance from shore. Therefore, lifejackets should be worn at all times while still on water.[1] While lifejacket ownership was high, this study shows that it does not necessarily translate into use. There could be other influencers. Previous studies found that people do not wear lifejackets because of distrust in the quality of the lifejackets available at the landing sites, while others perceived a low risk of drowning especially when the waters are calm.[12 16 31] In another similar setting like Tanzanian Lake Victoria fishing communities, lifejacket wear was low at 2%[13] but substantially higher at 26% among the Ugandan counterparts on the same lake.[12]

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Table 3 Factors associated with lifejacket wear among occupational boaters on Lake Albert, Western Uganda

Variable		Interviewed (n)	Users	%	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	P value
Sociodemographic factors							
District where landing site is located	Buliisa	296	93	31.4	1.00	1.00	
	Hoima	381	121	31.8	1.11 (0.63 - 1.96)	0.89 (0.63 - 1.28)	0.537
	Kikuube	386	174	45.1	1.58 (0.85 - 2.96)	1.25 (0.90 - 1.74)	0.184
	Ntoroko	86	12	14.0	0.51 (0.31 - 0.85)*	0.59 (0.40 - 0.85)**	0.005
	Pakwach	194	28	14.4	0.40 (0.07 - 2.25)	0.47 (0.23 - 0.96)*	0.039
Age (complete years)	Less than 20	31	9	29.0	1.00	1.00	
	20 to 29	516	194	37.6	1.13 (0.69 - 1.87)	0.88 (0.56 - 1.38)	0.584
	30 to 39	439	123	28.0	0.87 (0.55 - 1.39)	0.66 (0.45 - 0.99)*	0.042
	40 to 49	226	67	29.6	0.98 (0.57 - 1.68)	0.70 (0.43 - 1.13)	0.148
	50 and above	131	35	26.7	0.87 (0.48 - 1.58)	0.70 (0.46 - 1.05)	0.087
Ethnicity	Alur	913	315	34.5	1.00	1.00	
	Mugungu	160	42	26.3	0.85 (0.59 - 1.23)	0.80 (0.55 - 1.18)	0.265
	Munyooro/Mutooro	135	24	17.8	0.58 (0.32 - 1.04)	0.56 (0.35 - 0.91)*	0.020
	Other	135	47	34.8	0.98 (0.65 - 1.47)	0.99 (0.72 - 1.35)	0.947
Religion	Anglican	286	92	32.2	1.00	1.00	
	Catholic	661	204	30.9	0.93 (0.70 - 1.23)		
	Muslim	188	64	33.7	1.04 (0.82 - 1.32)		
	Pentecostal	158	57	36.1	1.04 (0.77 - 1.40)		
	Other	48	11	22.9	0.74 (0.48 - 1.14)		
Education level reached	None	326	101	31.0	1.00	1.00	
	Primary	51	15	29.4	0.84 (0.50 - 1.42)	0.94 (0.58 - 1.52)	0.790
	Secondary	943	301	31.9	1.03 (0.85 - 1.25)	1.09 (0.94 - 1.27)	0.269
	Tertiary/university	23	11	47.8	1.46 (1.02 - 2.11)*	1.57 (1.29 - 1.91)**	<0.001
Marital status	Single	273	70	25.6	1.00	1.00	
	Married	1070	358	33.5	1.22 (0.97 - 1.54)		
Have a child <10 years old	No	273	76	27.8	1.00	1.00	
	Yes	1070	352	32.9	1.15 (0.92 - 1.44)	1.24 (0.96 - 1.59)	0.096
Occupation	Transporter	136	56	41.2	1.00	1.00	
	Fisherman	1207	372	30.8	0.72 (0.45 - 1.15)		
Duration of occupation	At most 12 months	26	10	38.5	1.00	1.00	
	More than 12 months	1317	418	31.7	0.95 (0.62 - 1.46)		
Occupancy of current dwelling unit	Owner	603	168	27.9	1.00	1.00	
	Renting (tenant)	740	260	35.1	1.11 (0.91 - 1.36)		
Average weekly expenditure	Less than 50 000	270	62	23.0	1.00	1.00	
	50 000–100 000	729	224	30.7	1.17 (0.93 - 1.47)		
	101 000–200 000	295	117	39.7	1.48 (1.09 - 2.01)*		
	201 000 and above	49	25	51.0	1.86 (1.31 - 2.65)**		
Type of phone owned	No phone	303	68	22.4	1.00	1.00	
	Feature phone	912	316	34.6	1.44 (1.06 - 1.96)*		
	Smartphone	128	44	34.4	1.47 (0.94 - 2.30)		
Lifestyle/individual factors							
Know how to swim	No	136	32	23.5	1.00	1.00	
	Yes, weak swimmer	620	188	30.3	1.29 (0.86 - 1.94)	1.21 (0.83 - 1.75)	0.315
	Yes, strong swimmer	587	208	35.4	1.48 (0.96 - 2.27)	1.25 (0.84 - 1.86)	0.266
Ever arrested not wearing a life jacket	No	772	235	30.4	1.00	1.00	
	Yes	571	193	33.8	1.01 (0.87 - 1.18)		
Frequency on a boat/canoe	Daily	634	208	32.8	1.00	1.00	
	Few days in a week	618	188	30.4	1.01 (0.84 - 1.23)		
	Once a week	91	32	35.2	1.29 (0.84 - 1.97)		
Number of people the subject went with to the lake	Two people	390	56	14.4	1.00	1.00	
	Three people	691	234	33.9	1.75 (0.99 - 3.09)	1.51 (0.91 - 2.51)	0.108
	At least four people	262	138	52.7	2.64 (1.43 - 4.89)*	2.12 (1.28 - 3.52)*	0.004
Been in a boat that capsized	No	760	259	34.1	1.00	1.00	
	Yes	583	169	29.0	0.91 (0.74 - 1.12)		

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Table 3 Continued

Variable		Interviewed (n)	Users	%	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	P value
Take intoxicating substances	No	757	245	32.4	1.00	1.00	
	Yes	586	183	31.2	0.93 (0.80 - 1.09)	0.98 (0.86 - 1.11)	0.753
Attended session on lifejacket use	No	1180	354	30.0	1.00	1.00	
	Yes	163	74	45.4	1.37 (1.12 - 1.68)*	1.25 (1.01 - 1.56)*	0.045
Number of trips in a day	One trip	1280	404	31.6	1.00	1.00	
	Two trips	57	22	38.6	1.20 (0.95 - 1.52)		
	Three or more	6	2	33.3	1.24 (0.53 - 2.91)		
Trained to operate a boat	From a friend/relative	1167	382	32.7	1.00	1.00	
	Another trainer	9	5	55.6	1.18 (0.75 - 1.88)		
	Not trained	167	41	24.6	0.71 (0.51 - 0.99)*		
Vessel and environmental factors							
Time of set-off	Daylight	699	204	29.2	1.00	1.00	
	Night-time	644	224	34.8	1.04 (0.88 - 1.24)		
Own a boat	No	1140	348	30.5	1.00	1.00	
	Yes	203	80	39.4	1.43 (1.1 - 1.80)*	1.44 (1.14 - 1.83)*	0.002
Type of boat owned	Fishing/transport boat	1198	415	34.6	1.00	1.00	
	Row boat	145	13	9.0	0.38 (0.15 - 0.97)*	0.43 (0.18 - 1.06)	0.066
Boat size	Small -≤3 metres	228	48	21.1	1.00	1.00	
	Big,>3 metres	1115	380	34.1	1.46 (1.07 - 2.00)*	1.55 (1.13 - 2.12)*	0.007
Boat has provision for lifejacket storage	No	902	239	26.5	1.00	1.00	
	Yes	441	189	42.9	1.52 (1.25 - 1.85)**	1.34 (1.11 - 1.62)*	0.002
Weather condition at time of interview	Rainy	393	124	31.5	1.00	1.00	
	Sunny	950	304	32.0	0.97 (0.83 - 1.14)		

*P value <0.05; **<0.001.

Boat occupancy was associated with self-reported lifejacket wear. This is plausible because the boat occupants may remind each other to wear lifejackets, a behaviour that may be relatable to peer influence. A systematic review of factors associated with lifejacket use found that role modelling was a predictor of increased lifejacket wear among adolescents and indigenous communities.[32] This study found that self-reported lifejacket wear was significantly higher among people who used bigger boats than those who used smaller boats. Bigger boats may have more space for storage of lifejackets compared with the smaller ones. Indeed, as evidenced in this study, the provision of storage space in the boats was also associated with higher lifejacket wear. Our results are consistent with another study that also found that people in bigger boats were more likely to wear lifejackets[11] but contrary to a study which found that smaller boats were associated with increased lifejacket wear.[32]

Education/training was the only modifiable factor associated with higher lifejacket wear. These results suggest that training sessions on lifejacket wear may yield positive results as demonstrated in some other studies elsewhere.[33 34] Moreover, about 88% of the study participants had never received any form of training or sensitisation on lifejacket use, suggesting that training of boaters could have a high population attributable fraction (PAF) in increasing lifejacket use.[35] In addition, the results show that people who had attained a tertiary-level education were more likely users of lifejackets compared with those who had not gone to school. It is possible that those who had tertiary-level education understood the risks associated with non-use of lifejackets. Our findings are, however, different from a systematic review that reported education as one of the factors associated with inconsistent lifejacket use.[32]

A rowboat (non-motorised) or a fishing/transport boat (motorised) did not show a significant association with lifejacket wear. A case–control study of boat-related injuries in Washington State, USA, showed that people in non-motorised boats were at risk of drowning.[36] However, a systematic review of factors associated with lifejacket wear, and another study found that moving in a motorised boat was a predictor of increased lifejacket wear.[32 37] Noteworthy in these studies, the boats were categorised as small if they were ≤6 meters long,[32] different from our categorisation of <3 meters for a small boat. Furthermore, this study shows that lifejacket wear was significantly lower among people aged 30–39 years. In a systematic review on personal, social and environmental factors associated with lifejacket wear, younger age, especially children, was associated with increased lifejacket wear, but this started reducing as age increased.[32] From this study, lifejacket wear among fishermen and transporters was not statistically different, contrary to a study that showed that being a fisherman was positively associated with lifejacket wear.[32] However, it should be noted that in this context, it is not important to distinguish between a fisherman or transporter because they have a similar duration of exposure to water, and hence similar risk of drowning. According to the WHO, frequent access to water and non-use or inconsistent use of lifejackets are among the risk factors for drowning.[1]

There was no significant difference between people who perceived themselves as strong swimmers and those who did not know how to swim. It would be expected that people who know how to swim may be aware of the dangers associated with water, based on their experiences. Overestimation and higher confidence alongside perceived low risk of drowning tagged on swimming expertise is a major risk factor for drowning, as reported

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in other studies.[38 39] Elsewhere, perceived swimming expertise was associated with low lifejacket wear.[11 32 40] Consumption of intoxicating substances such as alcohol was also associated with reduced lifejacket wear. The consumption of such substances leads to poor judgement of the water and weather conditions, resulting in overconfidence and therefore reduced lifejacket wear. Although we expected higher lifejacket wear among the people who had ever been in a boat that capsized, our results show the contrary. There was less lifejacket wear among the boaters who had ever experienced a boat capsize. A previous study found that the boaters usually hang on their boats in the event of a boat capsize, citing it as one of the substitutes for lifejacket wear.[31]

This study is limited by the fact that, first, we relied on self-reported lifejacket wear. Self-reported practices are liable to information bias, especially social desirability bias, which might have made the participants report what they felt was acceptable. Second, our interviews always started at 07:00; it is possible that we missed out on the boaters who returned earlier than that time. In addition, due to the diverse cultural orientations, this study cannot be generalised to all boaters in Uganda because it was conducted among boaters on one lake out of the many in the country. However, we believe that our sample was powered enough to represent the boaters in the districts that neighbour Lake Albert on the Ugandan side.

CONCLUSION

This study shows that the observed lifejacket wear among the boaters involved in occupational boating activities on Lake Albert in Uganda is low, while self-reported lifejacket wear was substantially higher. Targeted, contextually relevant training on lifejacket use has the potential to improve lifejacket wear practices among the boaters involved in occupational boating activities on Lake Albert, Uganda.

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Contributors All authors made significant contributions to merit co-authorship. Frederick Oporia conceptualised the study, led the writing of the proposal and obtained ethical clearance, supervised the data collection process, oversaw the analysis, led the writing of the manuscript and played a supervisory role in the entire process. FEM provided technical guidance on the best statistical analysis approach for the study and the interpretation of the results. FN and SPSK participated in reviewing tools and advised on the data collection process and participated in the review and interpretation of findings. JBI participated in the review of the manuscript to ensure intellectual integrity. MN and RS supported the data analysis process, while JJ and OK provided expert advice based on their vast experience and knowledge in the field of drowning prevention, and reviewed the data collection tools to ensure the required data were collected. All authors reviewed and approved the final manuscript. However, FO takes full responsibility for the conduct of the study and final manuscript as the guarantor; he had full access to the data and controlled the decision to publish.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, conduct, reporting or dissemination plans of this research. Refer to the Methodology section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by the Makerere University School of Public Health Higher Degrees Research and Ethics Committee and registered with Uganda National Council for Science and Technology (registration #SS992ES). Administrative clearance from Uganda Police Marines and the leadership of the landing sites was obtained before the study. The participants gave informed consent to participate in the study before taking part.

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Data availability statement Data are available upon reasonable request. Due to confidentiality, data are publicly unavailable. However, data may be availed upon reasonable request to the corresponding author on foporia@musph.ac.ug.

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