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Rate, compliance and choice of life-saving equipment among commercial boat users and operators in southern Nigeria

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Abstract

One of the contributing factors to various water-related accidents along the Nigerian inland waterways is the inadequate or lack of compliance to various safety measures for water related activities including the use of life-saving equipment (LSE). This study appraised the rate, compliance and choice of LSE among commercial boat users and operators in Southern Nigeria. The study adopted the use of questionnaire in data gathering among commercial boat operators and users (commuters) from various jetties (12) which cut-across six (6) Southern States in Nigeria, where commercial boating activities is most predominant. The data was analyzed using descriptive and inferential (Pearson product momentum correlation) statistics. The findings revealed that the use of LSE is always (41.9%-boat operators and 63.4%-boat users) and compulsory (85.5%- boat operators and 93.5% - boat users. The outcome indicates that there was no selection choice of LSE (58.1%-boat operators and 64.1%- boat users). There was no statistically significant difference the choices of LSE and usage among commercial boat operators (where $p > 0.05$, $p = 0.252$) and users (where $p > 0.05$, $p = 0.738$) across the study area. The study concluded that the rate of the LSE usage is high, and compliance is compulsory across the studied jetties; hence, there is need for continuous enforcement practice to ensure increased compliance.

Keywords: Life-Saving Equipment; Inland Waterways; Boats; Nigeria

1. Introduction

Inland waterways have a unique role in Nigeria transportation system. Except for the multipurpose projects that provide benefits such as hydro power and flood protection, commercial navigation is the justification for Federal government investment in water ways (Ukoji and Ukoji, 2015). Statistics from National Inland Waterways Authority (NIWA) show that 22 out of 36 states in Nigeria use water as a means of transport and over 296 Nigerians were lost because of boat mishaps in the year 2013 (Ukoji and Ukoji, 2015). The inland waterways transportation sector has been an important part of the economy and contributed to the national GDP of Nigeria. Despite being an important part of the economy and vastness of the water transport network, it has many problems associated with safety and navigability.

Boat and ferry accidents are more prevalent than ever before in Nigeria due to increased patronage of water transportation (Akpudo and Stephens, 2020). As a result, unquantifiable numbers of lives have equally been lost while properties worth billions of Naira have been lost particularly for the last couple of decades (Akpudo, 2021). The problems associated with boat accidents have been under-emphasized. Drowning is a major cause of unintentional injury and death worldwide. The toll is greatest in low and middle-income countries (LMICs) that suffer over 90% of the burden. In high-income countries (HICs), drownings mostly occur during leisure and recreational activities (Quistberg et al, 2014; Oporia et al, 2021). Conversely, most drownings in LMICs occur during occupational activities

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and other activities of daily living such as fishing, collecting water and travelling (Kobusingye et al, 2017; Oporia et al., 2021). The World Health Organization (WHO) – African region bears the world's highest estimated drowning death rates at 8/100 000 population. Moreover, these global estimates do not include drownings from transportation and flood disasters which are frequent in many low-income settings (World Health Organization [WHO], 2014, 2017).

Risk factors for drowning include non-use of life saving appliances such as lifejackets, fishing, and water transportation (Kobusingye et al., 2017; Oporia et al., 2021). If worn correctly, the efficacy of lifejackets in preventing drowning is over 80%. However, lifejacket wear rates in both HICs and LMICs are low. Eighty-one per cent to 90% of people who drown from boating activities in HICs do not use lifesaving appliances such as wear lifejackets (Ryan et al, 2016; Wilcox - Pidgeon et al, 2019; Oporia et al., 2021).

Safety compliance is ranged from good to poor where complying with safety requirements remark as good safety compliance and not complying with safety requirements remark as poor safety compliance. The ABC model of behaviour by Frederick (1982; Abdullah et al., 2005) explained that behaviour is influenced by two distinct factors: activators and consequences. First, activators tell people what they should be doing, for example, wearing of lifejacket while water, roadways sign, instruct the driver to comply with speed limit and the other, is activators influenced the driver to take shortcut such as, seeing others exceed the posted speed limit (Zin and Ismail, 2012). Faced with these competing activators, the driver will perform certain behaviour, which comes to the consequences the driver expects to gain or avoid. Hence, the enforcement on safety behaviour factors plays the crucial role to encourage safety compliance before the consequences occurred (Zin and Ismail, 2012).

Advocating best practice in legislation, enforcement, and promotion of life saving equipment usage such as lifejacket wear has a key objective for reducing boating and watercraft-related drowning deaths (Peden et al, 2018; Wokoma and Akpoghomen, 2023). Hence, the study appraises the rate, compliance and choice of life-saving equipment among commercial boat users and operators in Southern Nigeria

2. Material and Methods

2.1. Study Area

The study area is within the coastal region of Southern Nigeria. Nigeria has a coastline of approximately 853km facing the Atlantic Ocean. This coastline lies between latitude 4° 10' to 6° 20'N and longitude 2° 45' to 8° 35'E. The terrestrial portion of this zone is about 28,000 km2 in area, while the surface area of the continental shelf is 46,300km^2 (Figure 1). The Nigerian coastal zone sprawls a total of nine coastal States; namely: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Lagos, Ogun, Ondo, and Rivers State. The coastal areas stretch inland for approximately 15km in Lagos in the west to 150 km in the Niger Delta and 25 km east of the Niger Delta (Kadafa, 2012). The coastline stretches for 853km comprising inshore waters, coastal lagoons, estuaries, and mangrove especially in the Niger Delta (Lambert-Aikhionbare, et al, 1984).

2.2. Study Design and Sample Size

The survey research method was adopted to carry out the study. This method was adopted because it is a suitable and efficient way of studying large population. To have proper coverage, the volume of daily passengers across the selected jetties based on the previous study conducted by Agava (2018) and Lagos State Waterways Authority (2017). The population was projected to 2021 at growth rate of 2.5% using Malthus Exponential Model (Table 1).

To get an optimum sample of the target population (1,773,696) the Taro Yamane (1967) formula for sample size determination will be adopted;

$$n = \frac{N}{1 + N\,(e)^2}$$

Where: e= Level of precision (0.05), N= Population, n= Sample size, 1= Constant

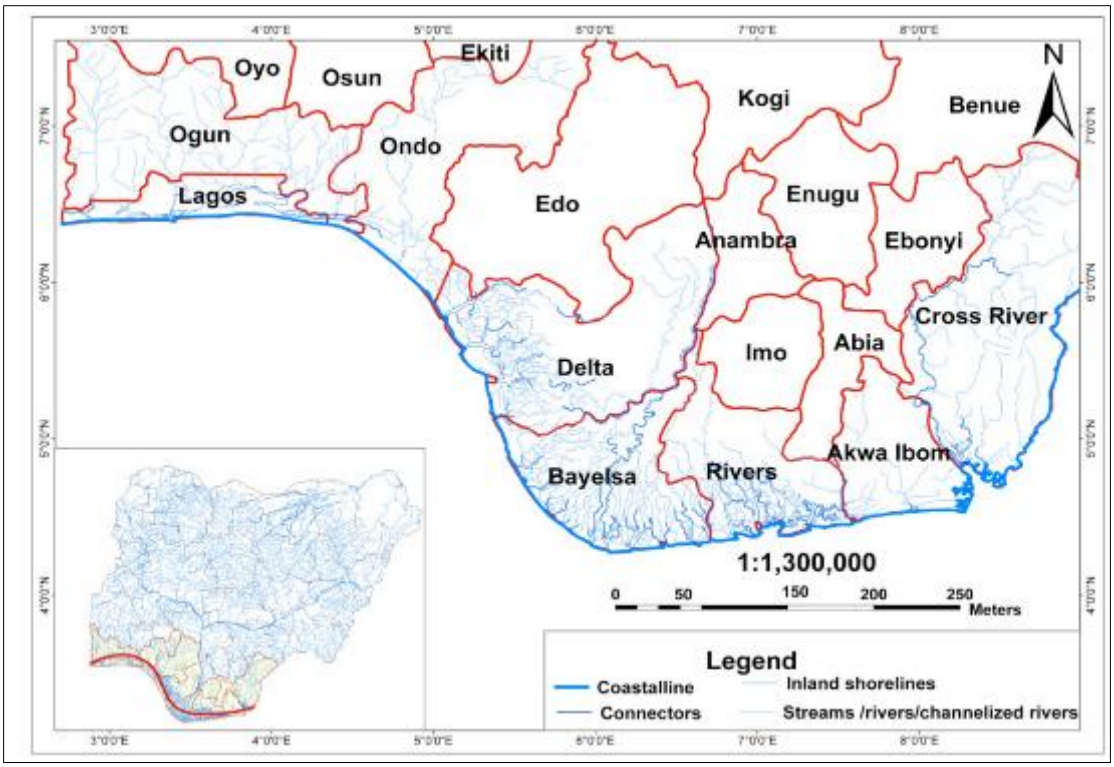

Figure 1 Coastal region of Southern Nigeria (Awosika, 2001)

$$n = \frac{37485}{1 + 37485(0.05)^2}$$

$$n = \frac{37485}{1 + 37485\text{x } 0.0025}$$

$$n = \frac{37485}{1 + 93.7}$$

$$n = \frac{37485}{94.7}$$

$$n = 396$$

For the study robustness and conveniences, the sample size was increased to 400. Therefore, the study total sample size was 400 respondents (Boat users and operators). Using proportionate sampling techniques, the distribution of the sample size (400) was based on the percentage of volume of traffic (projected) from each jetty which also determines the number of questionnaires that was administered among the jetties as indicated in Table 1.

Table 1 Study Population, Sample Size and Questionnaire distribution Across Jetties

States	Jetties	Volume Traffic (2017)	Projected Volume Traffic (2021)	Percentage Contribution (%)	Sample Size
Rivers	Nember/Bile	5,152	5,719	15.26	61
	Marine Base	2,980	3,308	8.82	35
Bayelsa	Nembe	3,440	3,818	10.19	40
	Akassa	2,016	2,238	5.97	24
Delta	Ovwian	2,120	2,353	6.28	25

	Igbudu	1,841	2,044	5.45	22
Cross River	Marina	2,640	2,930	7.82	31
	Ikang	3,550	3,941	10.51	42
Akwa Ibom	Oron Beach	2,325	2,581	6.88	28
	Effiat Waterside	1,938	2,151	5.74	23
Lagos	Falomo	2,847	3,160	8.43	34
	Liverpool	2,921	3,242	8.65	35
Total	12		37,485	100	400

2.3. Data Analysis

The retrieved copies of questionnaire were coded and subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS-21) for proper analysis. The data of the study were analysed through descriptive and inferential statistics (linear regression analysis).

3. Results

3.1. Socio-Demographic Details of the Respondents

The socio-demographic details of the respondents were presented in Table 2 for both the boat operators and users. For the boat operators, the analysis revealed that all the respondents were male (100%) within the age group of 18-35 (74.2%) and mostly single (58.1%). Also, most of the boat operators had primary level of education and they have been operation at the jetty in the last 2-4years (46.8%). Considering their type of boat for operation, the outcome indicated that most of the operators (40.3%) use wooden boats/ferries while 29.0% of the operators use motorized-medium power boats.

Among the boat users, 51.3% of those involved in the study were male while 48.7% were female within the age group of 36-50 (40.9%) and mostly married (61.4%). The outcome showed that most of the boat users hold a primary level education (37.9%) and engage in various professional occupations (35.0%). Considering the years they have been using the jetty, the outcome revealed that most of the boat users (42.8%) have using the jetty in the last 2-4years while 4.2% have been using the jetty in the last 9-12years.

Table 2 Socio-Demographic Details of the Boat Operators and Users

	Boat Operators		**Boat Users**	
Variable	**Frequency (n=62)**	**Percentage (%)**	**Frequency (n=306)**	**Percentage (%)**
Sex of Respondents				
Male	62	100.00	157	51.3
Female	--	-	149	48.7
Age (years)				
18-35	46	74.2	87	28.4
36-50	15	24.2	125	40.9
51-65	1	1.6	76	24.8
Above 65	-	-	18	5.9
Marital Status				

Single	36	58.1	111	36.3
Married	23	37.1	188	61.4
Divorced	1	1.6	7	2.3
Widowed	2	3.2	-	-
Level of Educational				
None	7	11.3	56	18.3
Primary	35	56.5	116	37.9
Secondary	12	19.4	104	34.0
Tertiary	8	12.9	30	9.8
Primary Occupation				
Unemployed	-	-	73	23.9
Professional Occupation	-	-	107	35.0
Skilled/Managerial Occupation	-	-	73	23.9
Manual/Partly Skilled	-	-	36	11.8
Self-employed/Commerce	-	-	10	3.3
Student	-	-	6	2.0
Others	-	-	1	0.3
Years of Jetty Operation/Usage				
Less than 1years	15	24.2	92	30.1
2-4years	29	46.8	131	42.8
5-7years	17	27.4	70	22.9
9-12years	1	1.6	13	4.2
13years above	-	-	-	
Responsibility at Jetty				
Boat Operators	62	100	-	-
Commuters (Boat Users)	-	-	306	100
Official (Regulator) for LGA	-	-	-	-
Official (Regulator) for NIWA	-	-	-	-
Others	-	-	-	-
Type of Boat Operating				
Utility-Fibre Boat	-	-	-	-
Wooden Boats/Ferries	25	40.3	-	-
Motorized-Larger Power Boats	19	30.7	-	-
Motorized-Medium Power Boats	18	29.0	-	-
Others	-		-	-

3.2. Rate and Compliance to Life- Saving Equipment Usage

The rate and compliance life-saving equipment among the boat operators and users was presented in the Table 3. Among the boat operators, 41.9% indicated that the use of life-saving equipment is always, 32.3% indicated to regularly

use of life-saving equipment while 16.1% and 9.7% of the operators indicated that the use of life-saving equipment is often and never use it respectively. Among the boat users, 63.4% indicated that the use of life-saving equipment is always, 23.2% indicated to regularly use of life-saving equipment while 11.4% and 2.0% of the users indicated that the use of life-saving equipment is often and never use it respectively. Also, 85.5% of the boat operators revealed that the use of life-saving equipment is compulsory, and all the operators (62) involved in the study revealed that no refusal to the use of life-saving equipment at the jetty. Also, 93.5% of the boat users (commuters) revealed that the use of life-saving equipment is compulsory, and all the commuters (306) involved in the study revealed that no refusal to the use of life-saving equipment at the jetty.

Table 3 Rate and Compliance to Life-Saving Equipment among Boat Operators and Users

	Boat Operators		**Boat Users**	
Variable	**Frequency (n=62)**	**Percentage (%)**	**Frequency (n=306)**	**Percentage (%)**
Use Life-Saving Equipment (Often)				
Always	26	41.9	194	63.4
Regular	20	32.3	71	23.2
Often	10	16.1	35	11.4
Never	6	9.7	6	2.0
Life-Saving Equipment Compulsory				
Yes	53	85.5	286	93.5
No	8	12.9	15	4.9
Others	1	1.6	5	1.6
Operators/Commuters Refuse the Use Life-Saving Equipment				
Yes	-	-	-	-
No	62	100	306	100

Source: Researcher's Filed Work, 2023

3.3. Choice of Life- Saving Equipment Usage

The choice of life-saving equipment among boat operators and users was examined and presented in Table 4. From the analysis, 27.4% of the operator indicated to have choice of life-saving equipment, 58.1% of the operators indicated that they have no choice of life-saving equipment. Considering the factors influencing the choice of life-saving equipment among the boat operators, 50.0% indicated that their choice was influenced by comfortability from the equipment, 4.8% indicated familiarity with equipment while 37.1% and 8.1% of the operators indicated that their choice was influenced by the easy to use of the equipment and high chance of safety in case of accident respectively. Among the operators, 27.4% revealed no change to their choice of life-saving equipment, while 43.5% of the operators don't know if they will be making change to their choice of life-saving equipment.

From the analysis, 22.2% of the boat users indicated to have choice of life-saving equipment, 64.1% of the users indicated that to have no choice of life-saving equipment. Considering the factors influencing the choice of life-saving equipment among the boat operators, 42.2% indicated that their choice was influenced by comfortability from the equipment, 4.9% indicated familiarity with equipment while 37.9% and 15% of the operators indicated that their choice was influenced by the easy to use of the equipment and high chance of safety in case of accident respectively. Among the users, 27.1% indicated to change to their choice of life-saving equipment, 15.0% indicated no change to their choice of life-saving equipment while 35.9% of the operators don't know if they will be making change to their choice of life-saving equipment.

Table 4 Choice of Life-Saving Equipment among Commercial Boat Operators and Users

	Boat Operators		**Boat Users**	
Variable	**Frequency (n=62)**	**Percentage (%)**	**Frequency (n=306)**	**Percentage (%)**
Choice of Life-Saving Equipment				
Yes	17	27.4	68	22.2
No	36	58.1	196	64.1
I do not Know	7	11.3	42	13.7
Others	2	3.2	-	-
Influence of Choice of Life-Saving Equipment				
Comfortability	31	50.0	129	42.2
Familiarity with the equipment	3	4.8	15	4.9
Easy to Use	23	37.1	116	37.9
High chance of safety in case of accident	5	8.1	46	15.0
Others	-	-	-	-
Change of Choice of Life-Saving Equipment				
Yes	-	-	83	27.1
No	17	27.4	46	15.0
I do not Know	27	43.5	110	35.9
Others	18	29.0	67	21.9

3.4. Hypothesis

From Table 5, the hypothesis of the study was tested using the PPMC analysis. The hypothesis was tested based on the following statement:

- H_0: There was no significant relationship between the choices of life-saving equipment and usage among commercial boat users and operators.
- H_1: There was a significant relationship between the choices of life-saving equipment and usage among commercial boat users and operators.

In explaining the outcome from the multivariate tests of significance, the Pearson correlation (r) was used in ascertaining the possible relationship between the choices of life-saving equipment and usage among commercial boat users and operators while the p-value was adopted to ascertain the level of significant (where $p \leq 0.05$ reject null hypothesis). For the boat operators, there was weak correlation between the choices of life-saving equipment and usage among commercial boat operators (where $r = 0.150$) and there was no statistically significant difference the choices of life-saving equipment and usage among commercial boat operators across the study area (where $p > 0.05$, $p = 0.252$). Among boat users, there was weak and negative correlation between the choices of life-saving equipment and usage among commercial boat users (where $r = -0.019$) and there was no statistically significant difference the choices of life-saving equipment and usage among commercial boat users across the study area (where $p > 0.05$, $p = 0.738$).

Table 5 Test of Significant Relationship

		N	Pearson Correlation	Sig. (2-tailed)
Choices and usage of life-saving equipment	Boat Operators	62	0.150	0.252
	Boat Users	306	-0.019	0.738

4. Discussion

4.1. Rate and Compliance to Life- Saving Equipment Usage

The rate and compliance to life-saving equipment usage among the boat operators and users indicated that they both use it always and regularly; although, the use of the life-saving equipment is compulsory among the jetties and none of the commercial both operators and user involved in the study refused the use of life-saving equipment. The outcome share similarity with study conducted by Viauroux and Gungor (2016) which indicated that the use of life-saving equipment such as lifejacket increases the adherence to the regulation in place in their study area as the use of lifejacket is compulsory. Similarly, Quistberg et al (2014) reported increase in wear and compliance with lifejackets due to strict policy with the compulsory use of lifejacket for all water-related activities.

4.2. Choice of Life- Saving Equipment Usage

The outcome revealed that the commercial boat operators and users do not have choice of life-saving equipment, and such could be attributed to limited availability of different life-saving equipment. However, the choice of life-saving equipment was influenced by comfortability, easy to use and high chance of safety in case of accident among the operators and users. Furthermore, both the boat operators and users were not sure if their choice of life-saving equipment could change in the nearest future. The outcome share similarity with study of Quistberg et al, (2014) which concluded that life jacket use may increase with more comfortable devices, such as inflatable life jackets, and with increased awareness of their efficacy in preventing drowning. Furthermore, the outcome indicated there was no significant relationship between the choices of life-saving equipment and usage among commercial boat users and operators. This implies that the choice of life-saving does not interpret to its usage in the study area considering the limitation in the availability of life-saving equipment.

5. Conclusion

Nigeria inland waterways have witnessed various water-related accidents over the years leading to commuters' deaths, injuries, missing or drown. One of the contributing factors to this menace is the inadequate or lack of compliance to various safety measures for water related activities including the use of life-saving equipment. Having considered the rate, compliance and choice of life-saving equipment among commercial boat users and operators in Southern Nigeria, the study concluded that the rate of the life-saving equipment usage is high, and compliance is compulsory across the studied jetties. There is need for continuous enforcement practice such as fines and suspension should be put in place to ensure increase compliance among operators while boat users should be made to wear their LSE properly and accordingly before entry the boat and during the ride.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclsoed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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