



Social and economic wellbeing of seafarers across coastal Nigeria amidst Corona virus disease[☆]

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ABSTRACT

One of the industries hit hard by the Corona Virus is the shipping industry. This is because there was serious paucity in the movement of people and goods. This also affected not only the social but also the economic well-being of seafarers. Therefore, this study assessed the social and economic well-being of seafarers across coastal Nigeria, amidst COVID. A cross-sectional research design was deployed, and data was generated through questionnaire administration. Analysis was done using Mann Kendal correlation and K-Wallis tests. Findings indicated COVID-19-induced social challenges included fatigue; and sleeping disorders. Mann Kendal correlation analysis indicated a relationship between COVID-19 and social challenges. Among COVID-19-induced economic challenges were unemployment, sacking, and salary slash. The Kendal relationship between COVID-19 and economic challenges was significant, implying, social challenges encountered by seafarers were related to COVID-19. K-Wallis test outcome for the spatial difference in economic challenges encountered by seafarers was significant. Implying a significant difference in the economic challenges posed by COVID-19 on seafarers in the study area. Based on the findings herein, social engagement programs, and poverty alleviation schemes are among the recommendations advanced for seafarers.

1. Introduction

A Seafarer represents a person who works aboard a ship, vessel, or boat [1,2]. It also refers to a person that engages in sailing [3,4]. A broader view of this classification and definition of who a seafarer is means that it covers persons who involve in the ship operation, maintenance, and provisioning of those on board [5–7]. Similarly, it includes ratings, engineers, deck officers, and those working in the catering section [1,7]. Seafarers oversee operations on a variety of different ships and handle various types of cargo to ensure their safe arrival at their respective destinations [8,9]. These operations have been on from the cradle of civilization [10,11]. Hitherto, there have been few challenges to seafarers' operations; some severe (previous global pandemics and wars) others not so severe (pirates attack, engine malfunction, etc). However, seafaring operations changed in the wake of the coronavirus disease in 2019 to date (see

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Figs. 5–7).

The winter of 2019, heralded the first incidence of coronavirus (COVID-19) disease first in Wuhan China, and later to other parts of the world (WHO, 2020). Nigeria witnessed the first case of the disease in Lagos on February 27, 2020 [12]. Since then, COVID-19 incidence in Nigeria has steadily increased, shifting from an imported case with an elitist dimension cum perception to community-based transmission [13]. Globally, an estimated 418 M persons have been infected, with about 5.85 m fatalities, and the sick and elderly makeup many of the fatalities [14,15]. This represents a fatality rate of 1.4% and far less than this percentage of fatality exists in Nigeria [16]. The spate of infections and the ease of spread of the disease, made many countries announce several protocols and eventually lockdowns in the year 2020. Agitations, hunger, and the mental stress caused by the lockdowns made governments of nations lift the lockdowns and this gave rise to the second wave of the disease with over 7 M infection cases recorded globally and in the following countries as of June 7, 2020, experienced cases of COVID-19 as displayed: United States (over 2 million cases), Brazil (over 700,000 cases), Russia (over 500,000 cases), South Africa (over 54,000 cases), Egypt (over 38,000 cases) [17] and Nigeria (over 6000 cases) [18].

As a result of COVID-19, several millions of businesses have been affected globally; with so many businesses facing extinction [2, 19–23]. More than half of the world's population has their sources of livelihood threatened by the disease. Sadly, the majority of the informal economy workforce lacks social protection, as such, they are particularly vulnerable to the effects of the disease. Nigeria is also extremely vulnerable to the global economic disruption caused by COVID-19, owing to a sharp drop in oil prices (although, there is a little rise in oil prices now) and a surge in risk aversion in global capital markets [24]. Also, over 53 million vulnerable people in Nigeria have been made poor because of COVID-19 [25]. Upon this premise, studies have been concentrated on the socioeconomic aspect of COVID-19 effects on, health workers, and health facilities/distribution to handle COVID-19 [26]. [17] posited, the pandemic has wreaked havoc on Nigerians' socioeconomic well-being and overstretched the health facilities as well as the health workers. Unfortunately, Nigeria's health system is unprepared to deal with this havoc, hence necessitating the need for studies in another aspect of the economy. According to Ref. [27] the continued lockdown paralyzed the spectrum of transportation and tourism industries in various countries of the world [13]. on the other hand, did a review of the COVID-19 pandemic and seafarers in Nigeria, without empirically evaluating its effect on seafarers and that of vaccines on seafarers. This current study shall look at the social and economic effects of COVID-19 on seafarers on one hand, and on the other hand, the effects of the vaccine on seafarers.

During this period, there have being complain by seafarers that the outbreak of COVID-19 put them in precarious situations around the world and Nigeria in particular [25]. To them, travel restrictions imply that mariners can't leave their ships, get home or even receive urgent medical help outside the ship [28,29]. Some seamen have seen their contracts terminated or in some instances, forced to take half pay, amid high economic inflations. Similarly, seamen have to factor some quarantine period into work time; whether going on-board or coming out of the sea, without any extra payment [19,30,31]. Similarly, seamen spend so much time on board, which is beyond the time they originally trained for or are paid for [32]. Albeit, because of the contagiousness of the disease, there is an aggressive campaign by the Nigerian Centre for Disease Control (NCDC); for people to be vaccinated even in the reality of many outright rejections of the COVID-19 vaccines; because of uncertainties surrounding the development of the vaccines [33–35]. While some asserted that the vaccine's effects are severe, others (who have taken the vaccine) claim the effects of the vaccines are mild and largely tolerable [35]. But there is no denying the fact that the pandemic has affected sea transportation and mariners. This study thus aims at evaluating the impacts of COVID-19 on seafarers with attention to the economic and social consequences of COVID-19 across selected jetties along coastal Nigeria. The objectives of the study are to; determine the relationship between COVID-19 and the social challenges of seafarers; examine the relationship between COVID-19 and the economic challenges of the seafarers; identify the difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area and finally, identify the difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area. On the other hand, the listed hypotheses were tested at the 0.05 level of significance: a) there is no significant relationship between COVID-19 and the social challenges of seafarers; b) there is no significant relationship between COVID-19 and the economic challenges of the seafarers, c) there is no significant difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area, and d) there is no significant difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area.

2. Conceptual framework

This study is conceptualized along the thinking of the vulnerability concept. This concept was developed by Ref. [36]. The philosophical underpinning of the concept is that an original system can be plagued beyond the capacity of its constituents to cope. This will either cause adaptation to the new normal or overwhelm the system. The generalized equation for vulnerability is defined as in equation (1) below:

$$\text{Vulnerability} = \text{Exposure} \times \text{Susceptibility} = \text{Coping Capacity} \quad (1)$$

Vulnerability shows fluidity in definitions and its applicability cuts across various branches of learning. Generally, the ability of humans or a physical/socio-economic system to cope with the risk impacts of COVID-19 and the restrictions for seafarers is an issue of concern for the mariners. A little risk has the propensity to cause system failure if resistance is low [37]. The capacity to manage serious or devastating stress is a product of risk planning, spontaneous adaptation, relief, and reconstruction [37].

Management of disaster cycle (MDC) presents the ideology implying whether things or a system are vulnerable or at risk, or both. Intricately, abstractions related to MDC are transmittable by paying attention to the catastrophe management cycle (CMC). An instance is that coping capacity could highlight preparation before a catastrophic event; available management capacity cum the recovery

potency post events. The cycle points out that indicators depending on the time it occurs allow evaluation of events.

The introduction of the vulnerability concept here defines COVID-19 as the cause of system stress (see Fig. 1). The system is made of the seafarers and the water vehicles and their existing work conditions. The coming of COVID-19 introduced changes that seafarers have to cope with. These new introductions include delays and longer stay off work and home, due to the quarantine periods; salary slash due to poor economic situation, etc. Now the vulnerable group is the seafarer which these new changes can affect in various ways such as fatigue, incessant health breakdowns due to weak immune systems, poverty, sexual stress, etc. The seafarers are left with two options; a) cope and try to adapt to the changes or b) crash out of the system, business, or even die. A simplified model of this understanding is presented in Fig. 2.

3. Methods

3.1. Study area

The coastline of Nigeria stretches about 853 km and covers 8 states in Nigeria (see Fig. 3). These states are, Cross-Rivers, Akwa-Ibom, Rivers, Bayelsa, Delta, Ondo, Ogun, and Lagos. The coastline cuts across several towns and villages, which are hosts to many industries and fertile lands for agriculture. Also, the rivers have varieties of fish and sea foods that fishermen harvest from time to time for consumption and sustenance [38]. All these factors combine to make seafaring a viable business in the coastal states of Nigeria. Thus, the pandemic and the restrictions it imposes are a great cause for concern, not only because it affects the businesses and economic activities in the area, but it also affects the seafarers themselves, whose economy simply depends on seafaring for survival (see Fig. 4).

3.2. Methodology

3.2.1. Ethical approval

Ethical approval for this study was issued by the research units of the Nigerian Ports Authority (NPA) {NPA/HRU/2021/04/0231} and the Nigerian Maritime Administration and Safety Agency (NIMASA) {HR.NIMASA/2021/CVD100}. Furthermore, a written consent was obtained from all participants who were also free to decline the questionnaire process whenever they felt uncomfortable to continue.

3.2.2. Methods

This study is based on a cross-sectional research design [39]. The data used for this study were generated through the administration of questionnaire to different categories of seafarers, from captains to cooks. The target population was the seafarers who had just berthed from the sea. The reason for doing this was to minimize the risk of contracting or spreading the disease (COVID-19) since the protocol states that the seafarers were to be quarantined for two weeks and tested before the quarantine and after the quarantine,

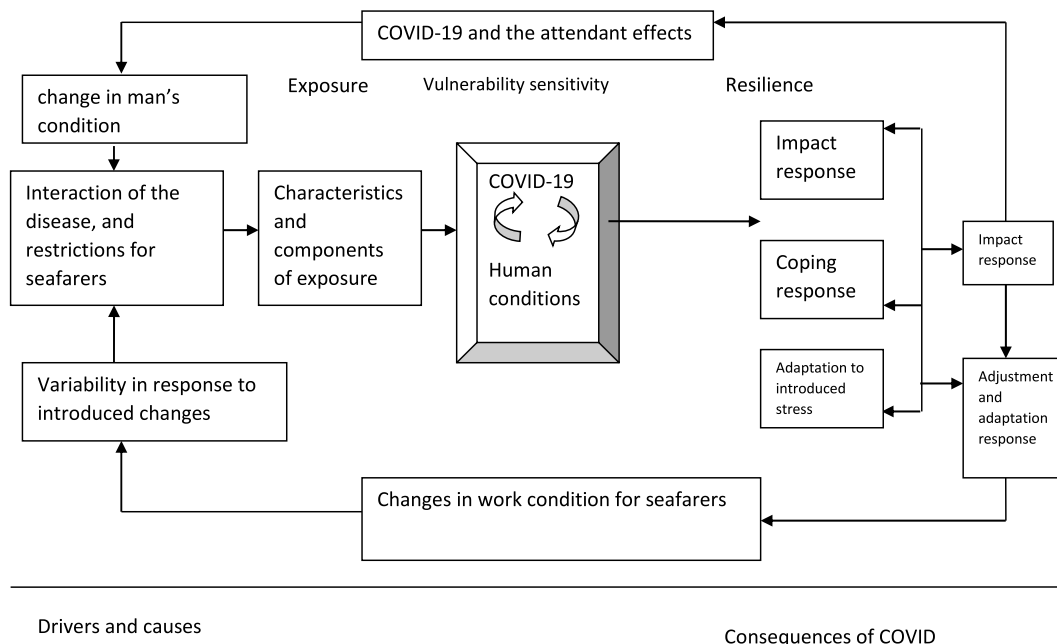


Fig. 1. A conceptual model for assessing COVID-19 and seafarers' vulnerability. Source: Authors.

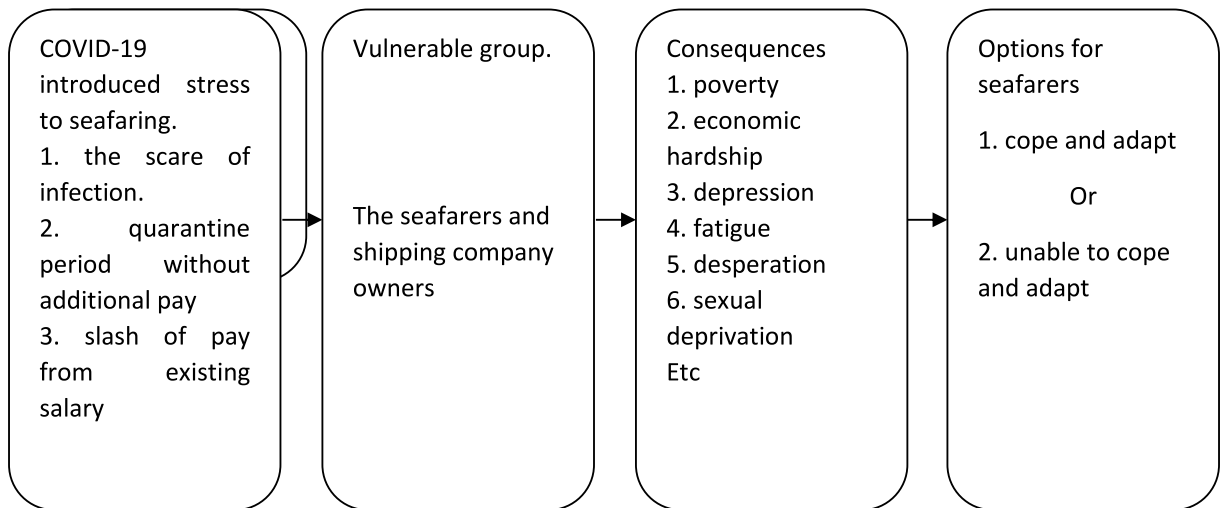


Fig. 2. Simplified explanation of the plight of the seafarers. Source: Authors.

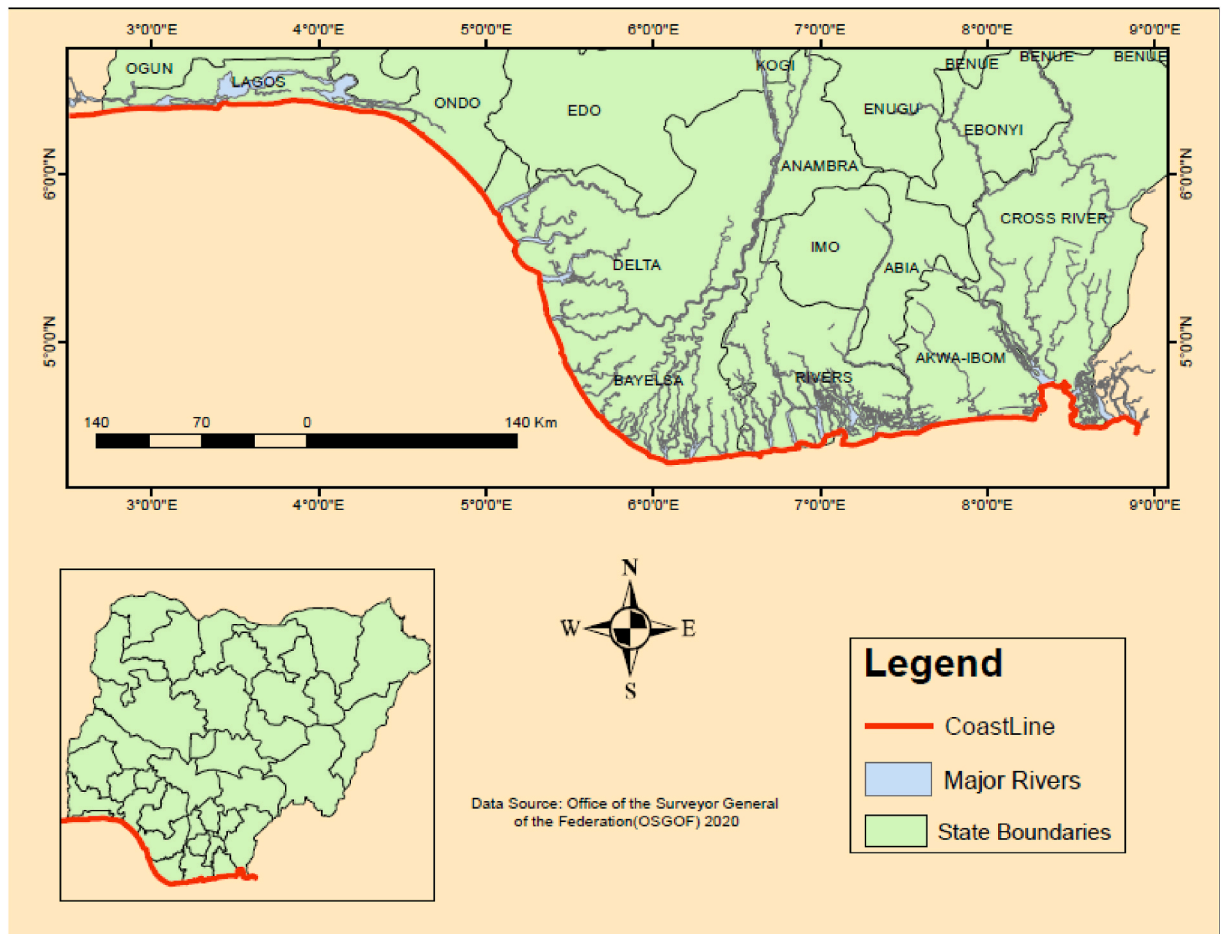


Fig. 3. Coastal Nigeria showing the major rivers where the jetties are located. Source: [39].

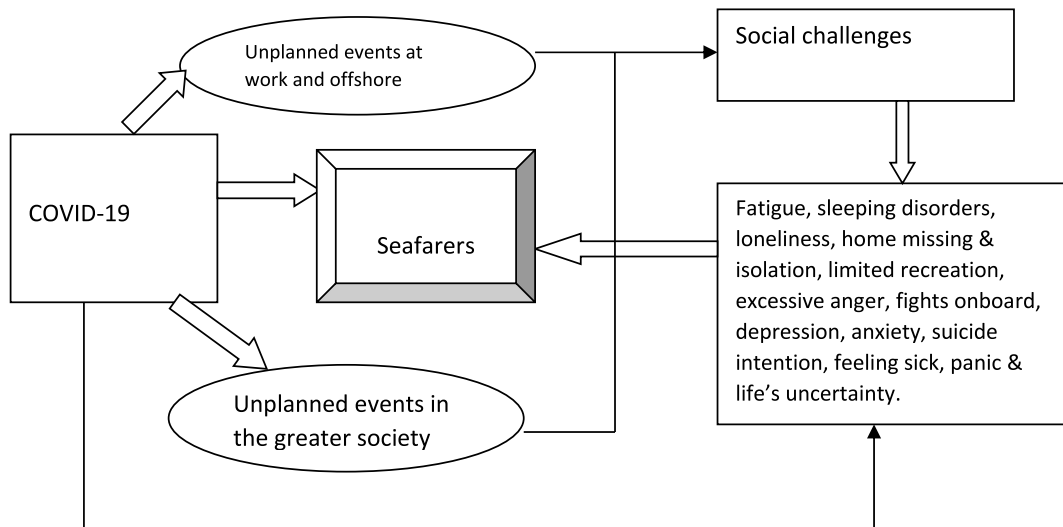


Fig. 4. The diagrammatic display of Hypothesis A. Source: Authors.

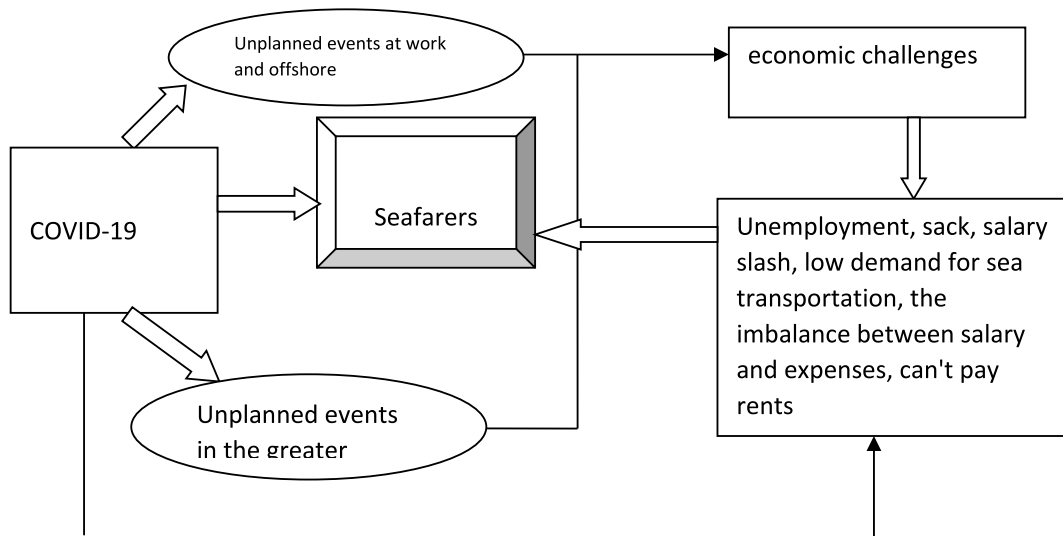


Fig. 5. The diagrammatic display of Hypothesis B. Source: Authors.

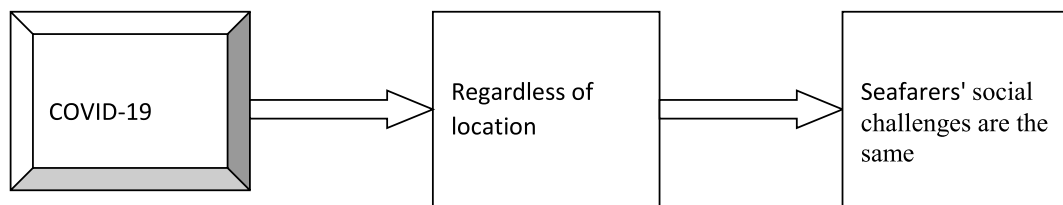


Fig. 6. The diagrammatic display of Hypothesis C. Source: Authors.

before going offshore. It was therefore expected that the seafarers just berthing won't have the virus, and have gone through the process before sailing. The count of target population was 9423 at berth time for all the listed jetties. Therefore, 10% of the total population was used for each jetty and the total sample size of 942 seafarers was derived (see Table 1). The 10% was used because the researchers wanted to be able to show the pervasive effect of the pandemic on seafarers so that the generalization from the findings won't be spurious [40–45]. The main factors that informed the 10% sample size determined were resources available, the restrictions

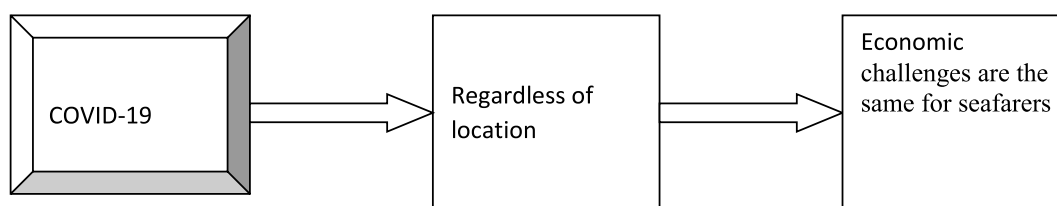


Fig. 7. The diagrammatic display of Hypothesis D. Source: Authors.

Table 1

Population distribution across the selected jetties along coastal Nigeria.

STATE	LOCATION	Total population per berthing time	10% of the total population per jetty
Anambra	River Niger Jetty	345	35
	Eke Market Jetty	289	29
Bayelsa	Hospital WaterFront	189	19
	Swali Market Water Side	542	54
	Fire Service Jetty Akassa	278	28
	Federal Medical Centre (FMC) Jetty	523	52
Cross Rivers	Marina Resort Jetty	332	33
	Safe Journey Jetty	289	29
Lagos	NIWA/Marina Jetty	590	59
	LASWA Jetty	1045	105
	Ikorodu Jetty	895	90
	Marina Jetty	590	59
	Apapa	242	24
	NIWA Jetty	124	12
	Badore	56	6
Ondo	Ajaba WaterFront	342	34
	Arogbo Waterside	165	17
Rivers	IOC - A Jetty	29	3
	IOC-N Jetty	342	34
	FOT & FLT Onne	689	69
	NPA Portharcourt	791	79
Delta	Abonema Wharf Jetty	274	27
	Delta line jetty	123	12
	Warri refinery jetty	339	34
Total		9423	942

Sources: Author's field survey (2021).

that were present at the time, and the risk of traversing the waterways in Nigeria.

The inclusive criteria to participate in the study were seafarers who had basic education and could communicate in English, and seafarers who didn't have any bias against the disease, either because of religion or speculation. The instrument was the 4-point Likert type of questionnaire, which was sectioned into 4 sections. The first inquired about the demographic characteristics of the respondent, the second section inquired about the social effects of COVID-19 on the seafarers, the third section inquired about the economic effects of the disease, the fourth section inquired about the perception of the seafarers about their perception of the vaccines.

In all, a total of 24 jetties were used for the study. The reason for selecting these jetties include the security of the researchers; accessibility; and functionality of the jetties. The jetties and the number of questionnaire used are listed in Table 1. All COVID-19 protocols were followed to avoid contamination. Some seafarers insisted they were tired and offered to respond after they have rested. To these categories of seafarers, the researchers used google docs, and emails to interact. Nevertheless, ethical approval was sought from the research units of the Nigerian Ports Authority (NPA) and the Nigerian Maritime Administration and Safety Agency (NIMASA). These two agencies reserve the direct right to grant access to research on the waterways of Nigeria. On the strength of the obtained approval, the seafarers also granted the researchers access and consent, to be used as part of the study population.

Data for this study were presented using statistical diagrams. The data generated from the questionnaire were collated using Excel. Before analyses were performed with the data transformation and normality tests were done in the environment of a statistical package for the social sciences (SPSS) as suggested by Ref. [46]. After the transformation of the data was achieved, quantitative assessments were performed to test the stated hypotheses. The thinking in this study is that COVID-19 has social and economic impacts on seafarers. Secondly, to determine the differences in effects of the disease on seafarers across the different jetties. Therefore, the developed hypotheses are as displayed.

- A) there is no significant relationship between COVID-19 and the social challenges of seafarers
- B) there is no significant relationship between COVID-19 and the economic challenges of the seafarers
- C) there is no significant difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area

To test the hypotheses, the Mann Kendal correlation was deployed for hypothesis A&B. The strength of the r value determined the extent of the relationship between parameters while the significance was validated against a 0.05 level of significance. Similarly, the paired t -test was used to test hypotheses C&D. The Hypotheses were tested at the 0.05 level of significance. The tests were performed in the environment of the IBM/SPSS version 25.

D) there is no significant difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area

4. Results

The total population sampled for this study was 942 respondents. The return of instrument rate was 100%. This was possible because of the currency of the topic, the challenges faced by the seafarers, and the inclusion of field assistants during data acquisition. However, [Table 2](#) presented the demographic characteristics of the respondents (seafarers). The topics of inquiry within the demographic characterization were Age, sex, education, job category, personnel, income, number of children, and estimated expenditure of the seafarers. The age of seafarers was distributed between 26 years and above 45 years. However, the majority of the seafarers fell within the 36–45 years cohort with 51.2%. The data suggested that the seafaring industry is male-dominated as male respondents represented 98.5% of the respondents while only 1.5% of them were females. The reasons for this include the stigma ascribed to seafaring for women and the cultural undertone. The academic qualification of the seafarers showed that they are fairly educated as 60.6% of them were graduates and only 36.6% of them had only secondary school qualifications.

The data showed that most of the respondents (78.1%) were contract staff (a sophisticated way of referring to casual staff in Nigeria). This also means during the peak of the COVID-19 impact, these workers probably had the worst of times, since it was not possible to invoke certain clauses or press demands through unions or pressure groups. The personnel type included captains (7%), officers (16.1%), Bosun (13.5%), Able Seamen (13%), engineers (9.1%), electricians (6.6%), oilers (22.4%), cooks (7.6%) and stewards (4.7%). This represents the spread and categorization of seafarers in Nigeria. However, the income of the workers ranged between 50,000 naira for the junior seafarers and above 300,000 naira for the senior workers. Sadly, the majority of the workers (58.2%) fell within the 50,000–150,000 naira a month category of seafarers. These seafarers have mostly 4–6 children (52.9%) to cater for with these meager salaries, considering the current inflation rates in the country. This finding is strengthened by the finding that the seafarers among other things spend money on, spends 20,000 naira (34.5%) 40,000 naira (58.6%), or over 40,000 naira (6.7%) on a child monthly. Therefore, any addition to the current stress in the seafaring industry by COVID-19 has far-reaching complications for seafarers.

[Table 3](#) depicts the social challenges encountered as a result of COVID-19. The identified social challenges were Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide

Table 2
The demographic characteristics of seafarers.

Demographics	Categories	Total n 930	
		N	Percentage (%)
Age	26–35	369	39.2
	36–45	482	51.2
	>45	91	9.7
Sex	Male	928	98.5
	Female	14	1.5
Education	SSCE	347	36.8
	Graduate	571	60.6
	Postgraduate	24	2.5
Job category	Contract	736	78.1
	Permanent	206	21.9
Personnel	Captain	66	7.0
	Officers	152	16.1
	Bosun	127	13.5
	Able seamen	122	13.0
	Engineers	86	9.1
	Electricians	62	6.6
	Oilers	211	22.4
	Cooks	72	7.6
	Stewards	44	4.7
Income ranges	#50000-#150000	548	58.2
	#150000-#300000	205	21.8
	>#300000	189	20.1
Number of children	1–3	189	20.1
	4–6	498	52.9
	>6	255	27.1
Estimated expenditure per child/month	<#20000	327	34.7
	#20000-#40000	552	58.6
	>#40000	63	6.7

Table 3
COVID-19 induced social challenges among seafarers.

COVID-19 induced Social issues	Opinion						Remark
	SA (%)	A (%)	D (%)	SD (%)	Total (%)	WM	
Fatigue	265 (28.1)	433 (46)	137 (14.5)	107 (11.4)	942 (100)	2.9	Agree
sleeping disorders	132 (14)	421 (44.7)	289 (30.7)	100 (10.6)	942 (100)	2.6	Agree
loneliness	613 (65.1)	219 (23.2)	89 (9.4)	21 (2.2)	942 (100)	3.5	Agree
home missing & isolation	342 (36.3)	431 (45.8)	105 (11.1)	64 (6.8)	942 (100)	3.1	Agree
limited recreation	444 (47.1)	242 (25.7)	145 (15.4)	111 (11.8)	942 (100)	3.1	Agree
excessive anger	201 (21.3)	398 (42.3)	219 (23.2)	124 (13.2)	942 (100)	2.7	Agree
fight on board	193 (20.5)	329 (34.9)	266 (28.2)	154 (16.3)	942 (100)	2.6	Agree
Depression	289 (30.7)	311 (33)	149 (15.8)	193 (20.5)	942 (100)	2.7	Agree
Anxiety	292 (31)	465 (49.4)	119 (12.6)	66 (7)	942 (100)	3.0	Agree
suicide intention	132 (14)	294 (31.2)	367 (39)	149 (15.8)	942 (100)	2.4	Disagree
feeling sick	334 (35.5)	361 (38.3)	188 (20)	59 (6.3)	942 (100)	3.0	Agree
panic & life's uncertainty	381 (40.4)	333 (35.4)	147 (15.6)	81 (8.6)	942 (100)	3.1	Agree

intention; feeling sick; panic & life's uncertainty. The weighted means showed that the constructs were all accented to by the seafarers as challenges they have had to face except suicide intention with a weighted mean average of 2.4. The percentage agreements or disagreements showed that 74.1% of the seafarers agreed that they are fatigued. This fatigue probably comes from excess work time, quarantine, and thoughts surrounding the uncertainties presented by the pandemic however, 25.9% of the respondents disagreed. This also shows that; all the respondents are not affected at equal levels by the pandemic. A large percentage (58.7%) of the seafarers accentuated that they have encountered sleep disorders in recent times, although 41.3% of them disagreed. However, for loneliness, 88.3% of the respondents attested that they are feeling lonely meaning the separation of the seafarers from their families and loved ones has a depilating consequence on the workers. They can't go home on time and when they go home they have to resume earlier for quarantine purposes. Their life and other social activities are withdrawn from them. This has remained consistent for some months without repeal. The same can be said of other social issues raised in Table 3. Sadly, although 54.8% of the seafarers disagreed that there are no pangs of suicide intentions, the mere fact that about 45.2% of the seafarers accentuated that they sometimes feel like committing suicide, shows that something needs to be done urgently about the modus operandi in the seafaring business in Nigeria. Thus, business as usual should no longer suffice.

N:B: SA-Strongly Agree; A-Agree; D-Disagree; SD-Strongly Disagree; %-the percentage of the original number of respondents; WM-weighted Mean or Weighted Average.

Table 4 revealed the Mann Kendal correlation analysis of the relationship between COVID-19 and the identified social issues. For COVID-19 and FTG, the r was 0.222 and also significant at $P < 0.05$, meaning that there is a correlation between COVID-19 and fatigue amongst seafarers; the r value realized between COVID-19 and SLD was 0.136 at $p < 0.05$. This means that there is a significant relationship between COVID-19 and sleeping disorders amongst seafarers along coastal Nigeria. The r value realized between COVID-19 and SUI is 0.186 and was significant at $p < 0.05$. This implied that there is no significant relationship between COVID-19 and Suicide intention.

The relationship between COVID-19 and HMI showed r 0.158 and was significant at $p < 0.05$. This meant that there is a significant relationship between COVID-19 and home missing among the seafarers. For COVID-19 and LR, the r was 0.333 and also significant at $P < 0.05$, meaning that there is a strong correlation between COVID-19 and limited recreation amongst seafarers. As for COVID-19 and EA, the r was 0.186 and also significant at $P < 0.05$, meaning that there is a strong correlation between COVID-19 and excessive anger amongst seafarers. COVID-19 and FOB revealed a Kendal r of 0.182 and also significant at $P < 0.05$, meaning that there is a correlation between COVID-19 and fights on board amongst seafarers. For COVID-19 and DPS, the r was 0.081 implying a weak correlation and significance at $P > 0.05$, depression amongst seafarers. COVID-19 and ANX revealed an r of 0.140 and also significant at $P < 0.05$, meaning that there is a correlation between COVID-19 and anxiety amongst seafarers. For COVID-19 and LLS, the r was 0.127 and also significant at $P < 0.05$, meaning that there is a strong correlation between COVID-19 and fatigue amongst seafarers. The same can be said of the other social variables inquired of in the area amongst seafarers.

Table 5 identified the COVID-19-induced economic challenges in the study area. The uncertainty brought by the pandemic created restrictions that had a reduced effect on the number of jobs available. The manifestation of this was unemployment for the seafarer (78.4% avouchment). Seafarers also agreed that sacking (97% avouchment) is one of the economic hardships introduced by the pandemic. Another manifestation of COVID-19 was the introduction of a salary slash (96.6% avouchment). Other economic situations imposed on the seafarers by the advent of the pandemic are low demand for sea transportation (61.4% avouchment), the imbalance between salaries and expenses (93.5%), and inability to pay housing rents (81% avouchment).

Table 6 shows the Kendal relationship between COVID-19 and the economic challenges highlighted by the seafarers. The intention was to unravel the relationships between the identified economic woes and the pandemic, on one hand, and the other hand if they were significantly related. The Kendal r between COVID-19 and seafarers' sacks was 0.872 and was significant at $p < 0.05$. This implies that there exists a significant relationship between the pandemic and the sack of seafarers. The Kendal r between COVID-19 and seafarers' salary slash (SSH) was 0.740 and was significant at $p < 0.05$. This implies that there exists a significant relationship between the pandemic and the salary slash of seafarers. The Kendal r between COVID-19 and seafarers' perception of low demand for sea transportation (LDST) was 0.942 and was significant at $p < 0.05$. This implies that there exists a significant relationship between the

Table 4
Mann Kendal correlation between COVID-19 and social challenges.

Correlations			COVID_19	FTG	SLD	SUI	HMI	LR	EA	FOB	DPS	ANS	LLS	FSK	PLU	
Kendall's tau_b	COVID_19	R Coeff	1													
		Sig. (2-tailed)	.													
		N	942													
	FTG	R Coeff	.222 ^a	1												
		Sig. (2-tailed)	.000	.												
		N	942	942												
	SLD	R Coeff	.136 ^a	.393 ^a	1											
		Sig. (2-tailed)	.000	.000	.											
		N	942	942	942											
	SUI	R Coeff	.186 ^a	.509 ^a	.562 ^a	1										
		Sig. (2-tailed)	.000	.000	.000	.										
		N	942	942	942	942										
	HMI	R Coeff	.158 ^a	.462 ^a	.390 ^a	.551 ^a	1									
		Sig. (2-tailed)	.000	.000	.000	.000	.									
		N	942	942	942	942	942									
	LR	R Coeff	.333 ^a	.410 ^a	.269 ^a	.414 ^a	.452 ^a	1								
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.								
		N	942	942	942	942	942	942								
	EA	R Coeff	.186 ^a	.356 ^a	.243 ^a	.388 ^a	.406 ^a	.621 ^a	1							
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.							
		N	942	942	942	942	942	942	942							
	FOB	R Coeff	.182 ^a	.350 ^a	.249 ^a	.332 ^a	.347 ^a	.567 ^a	.676 ^a	1						
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.					
		N	942	942	942	942	942	942	942	942						
	DPS	R Coeff	.081 ^a	.233 ^a	.177 ^a	.178 ^a	.254 ^a	.390 ^a	.527 ^a	.617 ^a	1					
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.					
		N	942	942	942	942	942	942	942	942	942					
	ANX	R Coeff	.140 ^a	.184 ^a	.086 ^a	.211 ^a	.229 ^a	.255 ^a	.411 ^a	.294 ^a	.393 ^a	1				
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.				
		N	942	942	942	942	942	942	942	942	942	942				
	LLS	R Coeff	.127 ^a	.282 ^a	.218 ^a	.274 ^a	.342 ^a	.422 ^a	.562 ^a	.430 ^a	.537 ^a	.510 ^a	1			
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.			
		N	942	942	942	942	942	942	942	942	942	942	942			
	FSK	R Coeff	.236 ^a	.115 ^a	.105 ^a	.147 ^a	.173 ^a	.351 ^a	.291 ^a	.270 ^a	.258 ^a	.314 ^a	.376 ^a	1		
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.		
		N	942	942	942	942	942	942	942	942	942	942	942	942		
	PLU	R Coeff	.377 ^a	.512 ^a	.448 ^a	.544 ^a	.535 ^a	.696 ^a	.617 ^a	.592 ^a	.467 ^a	.432 ^a	.564 ^a	.406 ^a	1	
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	
		N	942	942	942	942	942	942	942	942	942	942	942	942	942	

N: B FTG means Fatigue; SLD means sleeping disorders; LLS means loneliness; HMI means home missing & isolation; LR means limited recreation; EA means excessive anger; FOD means fights onboard; DPS means Depression; ANX means Anxiety; SUI means suicide intention; FSK means feeling sick; PLU means panic & life's uncertainty; and CVD-19 means COVID-19.

^a R is significant at the 0.01 level (2-tailed).

c

Table 5
COVID-19 induced economic challenges among seafarers.

COVID Induced Economic Issues	Opinion					WM	Remark
	SA (%)	A (%)	D (%)	SD (%)	Total (%)		
Unemployment	455 (48.3)	284 (30.1)	178 (18.9)	25 (2.7)	942 (100)	3.2	Agree
Sack	650 (69)	264 (28)	19 (2)	9 (1)	942 (100)	3.7	Agree
salary slash	721 (76.5)	189 (20.1)	17 (1.8)	15 (1.6)	942 (100)	3.7	Agree
low demand for sea transportation	242 (25.7)	336 (35.7)	293 (31.1)	71 (7.5)	942 (100)	2.8	Agree
the imbalance between salary and expenses	498 (52.9)	382 (40.6)	62 (6.6)	00 (00)	942 (100)	3.5	Agree
can't pay rents	431 (45.8)	332 (35.2)	121 (12.8)	58 (6.2)	942 (100)	3.2	Agree

N:B: SA-Strongly Agree; A-Agree; D-Disagree; SD-Strongly Disagree; %-the percentage of the original number of respondents; WM-weighted Mean or Weighted Average.

Table 6
Mann Kendal correlation between COVID-19 and economic challenges amongst seafarers.

Correlations			COVID_19	SK	SSH	LDST	IBSE	CPR	UPM
Kendall's tau_b	COVID_19	R	1						
		Sig.	.						
	SK	N	942						
R		.872 ^a	1						
	SSH	Sig.	.003						
R		.740 ^b	.220	1					
	LDST	Sig.	.014	.471	.				
R		.531	.114	.562 ^a	1				
	IBSE	Sig.	.052	.903	.000	.			
R		.760 ^b	-.119 ^a	.352 ^a	.402 ^a	1			
	CPR	Sig.	.011	.000	.000	.000	.		
R		.320	.111	.157 ^a	.335 ^a	.250 ^a	1		
	UPM	Sig.	.294	.715	.000	.000	.000	.	
R		.591 ^b	-.251	.270 ^a	.302 ^a	.201 ^a	.478 ^a	1	
		Sig.	.047	.402	.000	.000	.000	.000	.
		N	942	942	942	942	942	942	942

UPM refers to Unemployment; SK refers to Sack; SSH refers to salary slash; LDST refers to low demand for sea transportation; IBSE refers to an imbalance between salary and expenses; CPR refers to can't pay rents.

^a Correlation is significant at the 0.01 level.

^b Correlation is significant at the 0.05 level.

pandemic and LDST. The Kendal r between COVID-19 and seafarers' perception of imbalance between salary and expenses (IBSE) was 0.760 and was significant at $p < 0.05$. This implies that there exists a significant relationship between the pandemic and IBSE. The Kendal r between COVID-19 and seafarers' perception of can't pay rent (ie seafarers' inability to pay their housing rent) (CPR) was 0.320 and was not significant at $p > 0.05$. This implies that although there exists a relationship between the pandemic and CPR, it is not statistically significant. The Kendal r between COVID-19 and seafarers' perception of unemployment (UPM) was 0.591 and was significant at $p < 0.05$. This implies that there exists a significant relationship between the pandemic and UMP.

Table 7 revealed the K-Wallis test outcome for the spatial difference in the social challenges encountered by the seafarers in the

Table 7
Kruskal Wallis H test for the difference in COVID-19-induced social challenges amongst seafarers across coastal Nigeria.

COVID-19 induced Social Challenges	States	N	Mean Rank	Kruskal-Wallis H	Df	Asymp. Sig.	Remark (95% confidence level)
Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide intention; feeling sick; panic & life's uncertainty	Anambra	12	43.96	27.828	6	.000	Reject null & accept the alternate hypothesis
	Bayelsa	12	37.58				
	Cross-river	12	33.92				
	Lagos	12	64.50				
	Ondo	12	40.67				
	Rivers	12	55.79				
	Delta	12	21.08				

study area. The social challenges were Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide intention; feeling sick; panic & life's uncertainty. The test result showed Kruskal Wallis H of 27.8 and the *Asymp. Sig* of 0.000 at $P < 0.05$. This means that the null hypothesis stating that there is no significant difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area is rejected and the alternate accepted. This means that there is a significant difference in the social challenges posed by COVID-19 on seafarers in the study area.

Table 8 revealed the K-Wallis test outcome for the spatial difference in the economic challenges encountered by the seafarers in the study area. The economic challenges were Unemployment; Sack; salary slash; low demand for sea transportation; imbalance between salary and expenses; can't pay rent. The test result showed Kruskal Wallis H of 17.5 and the *Asymp. Sig* of 0.007 at $P < 0.05$. This means that the null hypothesis stating that there is no significant difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area is rejected and the alternate accepted. This means that there is a significant difference in the economic challenges posed by COVID-19 on seafarers in the study area.

5. Discussion

This study is about the social and economic well-being of seafarers across coastal Nigeria amidst coronavirus disease. The seafarers were hit hard during the pandemic for obvious reasons. Some of the reasons given were that the seafarers were not going to receive adequate attention offshore in event of an outbreak of the disease. Similarly, the spread of the diseases was going to be fast among other seafarers if there was an infected person among them; this is because the area (the ship) was so confined, and interaction is high among the seafarers. Thirdly, in the event of an infected person without symptoms, the spread to the onshore environment was going to be very high. Sequel to these fears alluded ditto, the Agency for Management of offshore activities in Nigeria (NIMASA) in conjunction with the Nigerian Centre for Disease Control (NCDC) came up with some strict rules that will later impact so hard on seafarers. This resulted in seafarers spending more time offshore than they were trained for. More so, they were also to stay onshore for a quarantine period of 21 days before heading offshore for work. The new normal was at nearly no improvement to the welfare of the seafarers. For instance, there was no increase in salaries to cater for the excess time spent on quarantines and offshore time extensions. More devastating was the lack of psychological orientation for the seafarers. Furthermore, there was serious inflation in the Nigerian economy at the time, so the existing salary structure could not handle the financial needs of seafarers. While seafarers were coping with these hardships, the shipping companies were cutting down on staff size. Overall, these factors resulted in serious social and economic challenges for seafarers.

To commence the study the commercial jetties of the coastal belt of Nigeria were used and formed the study base for the study respondents. The cross-sectional research design was utilized herein, and data was generated via the administration of questionnaire to different categories of seafarers. The objectives of the study were to; determine the relationship between COVID-19 and the social challenges of seafarers; examine the relationship between COVID-19 and the economic challenges of the seafarers; identify the difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area and finally, identify the difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area. On the other hand, the tested hypotheses were: a) there is no significant relationship between COVID-19 and the social challenges of seafarers; b) there is no significant relationship between COVID-19 and the economic challenges of the seafarers, c) there is no significant difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area, and d) there is no significant difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area.

The study found that seafarers were mostly on contract at the time of the surge of the COVID-19 disease. It is important to note here that these categories of workers have no access to worker bonuses, or incentives [13]. Such breaks occasioned by the COVID-19 lockdowns were a serious challenge for the workers' economic well-being. Worse is that these workers couldn't invoke certain clauses or press demands through unions or pressure groups, as they were mostly casual seafarers. It is on record that casual workers are not given any consideration in Nigeria, because there is more labor chasing the available jobs [13]. However, the range of salaries was generally poor. Looking at the inflation rates in Nigeria at the time (17.5%) we believe that it was near impossible or impossible for such workers to have had any savings. COVID-19 was therefore a crisis for such seafarers who possibly did not plan for such eventuality. To make this more serious for the seafarers, they seafarers mostly had between 4 and 6 children to care for, in the face of dwindling resources. This composed a far-reaching consequence of financial and social dilemmas for the workers. The stress of not being able to care for dependents, not only constitutes a social challenge but can also lead to challenges such as depression as rightly captured in Table 4.

The burden of not being able to go about one's daily work is usually far-reaching and its consequences are pervasive. In this study, the identified social challenges included fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; depression; anxiety; suicide intention; feeling sick; panic & life's uncertainty. The correlation matrix in Table 4 confirmed that there is a significant correlation between COVID-19 and social challenges faced by the seafarers (Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide intention; feeling sick; panic & life's uncertainty) at $p < 0.05$ as anticipated by the hypothesis. The feeling of being caged or quarantined without proper orientation caused several social challenges for seafarers. For instance, many of the seafarers have taught themselves over the years how to work and rest afterward (recreate). When the body isn't put to work after some time, diminishing return starts to happen. The workers since they didn't go to work started experiencing serious insomnia [14]. reported that the idleness of a person, who hitherto works, leads to severe depression which emanates from deep thoughts, rationalization of uncertainties, and hopelessness for the future. This finding agrees with the finding of [23], who found a similar occurrence amongst seafarers. However, it disagreed with that of [47] who adduced that the seafarers possibly used the quarantine and lockdown periods to rest, recreate lost

Table 8

Kruskal Wallis H test for the difference in COVID-19-induced economic challenges amongst seafarers across coastal Nigeria.

COVID-19 induced Economic Challenges	States	N	Mean Rank	Kruskal-Wallis H	Df	Asymp. Sig.	Remark (95% confidence level)
Unemployment; Sack; salary slash; low demand for sea transportation; imbalance between salary and expenses; can't pay rents	Anambra	6	21.67	17.553	6	.007	Reject null & accept the alternate hypothesis
	Bayelsa	6	22.25				
	Cross-river	6	13.67				
	Lagos	6	32.00				
	Ondo	6	22.75				
	Rivers	6	29.00				
	Delta	6	9.17				

energy and rejuvenate against the time for recall to work. Sadly, they did not consider the financial and emotional stress that was involved with the seafarers being idle and quarantined. Nevertheless, this finding confirmed the vulnerability theory advanced in this study, wherein the assumptions were that the impact of COVID-19 would affect human interaction and cause some social problems which will require some adaptations. Sadly, to date, proper adaptation strategies have not been adopted. Though the COVID-19 milieu has reduced in the sting, its resurgence or even an outbreak of another disease is possible, thus implicating the need for improvement in the coping strategies for diseases in the maritime environment.

As for the economic effects of COVID-19 (see Table 5) the study found that the uncertainty brought by the pandemic created restrictions that had a reduced effect on the number of jobs available, therefore, unemployment increased. This means that even if the seafarers wanted to find meaner jobs to do, they could not find them, consequently increasing the pressure of not being financially able to cope with the stress resulting from family and dependants [14]. It is commonplace in Africa to find that the working member of the family takes care of the non-working members of the family [29]. Wherein, the lockdowns persisted, and the financial demands remained, frustration is capable of setting in. Furthermore, where work was possible, the introduction of salary slash prevailed, and expenses persisted. This was not easy to cope with. This finding agreed with that of [35] who suggested that such occurrence could lead to depression or desperation. Other economic situations imposed on the seafarers by the advent of the pandemic are low demand for sea transportation, the imbalance between salaries and expenses, and the inability to pay housing rents. The hypothesis 'there is no significant relationship between COVID-19 and the economic challenges of the seafarers' was confirmed in the table suggesting that there is a significant correlation between COVID-19 and economic challenges (Unemployment; Sack; salary slash; low demand for sea transportation; imbalance between salary and expenses; can't pay rents) faced by the seafarers during the covid-19 lockdowns and beyond (see Table 6). This also confirms the tenets of the proposed theory of seafarers' vulnerability to COVID-19; where it was advanced that the impacts of COVID-19 on seafarers may include far-reaching economic challenges (see Fig. 1).

The K-Wallis test outcome for the spatial difference in the social challenges encountered by the seafarers (Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide intention; feeling sick; panic & life's uncertainty) showed Kruskal Wallis H of 27.8 and the *Asymp. Sig* of 0.000 at $P < 0.05$ (see Table 7). This was a particularly surprising result, as the lockdowns were thought to have the same or similar effects on the seafarers. This thus implicates the fact that some shipping lines had better welfare packages and incentives for seafarers. More so, there may have been some companies who attempted better orientation and coping strategies for their workers than others.

In a similar vein, the K-Wallis test outcome for the spatial difference in the economic challenges encountered by the seafarers revealed that there was a significant spatial variation in the economic challenges posed by COVID-19 on seafarers in the study area; at Kruskal Wallis H of 17.5 and the *Asymp. Sig* of 0.007 at $P < 0.05$ (see Table 8). This is not surprising, as the approaches to workers' welfare in the area may be different. As such the outcomes of the economic effects of COVID-19 can be different.

Characteristically, the sea transportation business in Nigeria is a growing one, with several challenges. The pandemic came with it several other challenges which are embedded in social and economic challenges. The government pays no attention to the seafarers [13], as they (the government) only care about the fines and amounts of money that accrue to them from the proprietors [13]. In the same vein, the workers have no say in the scheme of things, as there are no labour unions nor any system in place to guarantee the security of the jobs of the seafarers. Therefore, the seafarers had a very bad time at the peak of the lockdowns and the pandemic. This is because the shipowners dished out their work pay policies without considering the welfare of the seafarers. The seafarers, on the other hand, had no choice, since if they complained they could be replaced easily. This was a case of double tragedy for the seafarers who already had social life change issues to deal with.

Albeit, the findings from this suggest that the seafarers cannot cope with any financial hardship when there is a shock in the system. The study proved that seafarers were confronted with serious social issues that resulted from the quarantines and isolations. Thus, we recommend that social engagement programmes, poverty alleviation schemes, and a social welfare system be created among the seafarers, to make the system more sustainable and embracing for the seafarers. It is also important that coping capacity is enhanced for the seafarers for eventualities such as COVID-19, as no one foretells such pandemics.

6. Conclusion

This study investigated the social and economic well-being of seafarers across coastal Nigeria amidst coronavirus disease. The seafarers were seriously affected because of the stringent policies initiated by the regulatory organizations and the Centre for Disease

Control (NCDC). Some of these measures include but are not limited to; spending more time offshore, than they were trained for. More so, they were also to stay onshore for a quarantine period of 21 days before heading offshore for work. The new normal came with nearly no improvement in the welfare of the seafarers. For instance, there was no increase in salaries to cater for the excess time spent on quarantines and offshore time extensions. More devastating was the lack of psychological orientation for the seafarers. Furthermore, there was serious inflation in the Nigerian economy at the time, so the existing salary structure could not handle the financial needs of seafarers. While seafarers were coping with these hardships, the shipping companies were cutting down on staff size. Overall, these factors resulted in serious social and economic challenges for seafarers.

However, to execute this study the commercial jetties of the coastal belt of Nigeria were used and respondents were targeted therefrom. The cross-sectional research design was used, and data were generated using questionnaire. The objectives of the study were to; determine the relationship between COVID-19 and the social challenges of seafarers; examine the relationship between COVID-19 and the economic challenges of the seafarers; identify the difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area and finally, identify the difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area. On the other hand, the tested hypotheses were: a) there is no significant relationship between COVID-19 and the social challenges of seafarers; b) there is no significant relationship between COVID-19 and the economic challenges of the seafarers, c) there is no significant difference in the social challenges caused by COVID-19 on seafarers across the jetties in the study area, and d) there is no significant difference in the economic challenges caused by COVID-19 on seafarers across the jetties in the study area.

The study found that seafarers were mostly on contract staff and others that had full jobs was poorly paid to the intent that the amount paid was not able to cater to their day-to-day financial demands. The social challenges that affected the seafarers as a result were fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; depression; anxiety; suicide intention; feeling sick; panic & life's uncertainty. The correlation matrix confirmed that there is a significant correlation between COVID-19 and social challenges faced by the seafarers.

Similarly, the economic effects of COVID-19 created uncertainty and reduced the number of jobs available, therefore, unemployment increased. Therefore, coping financially with family and dependent expenditures became difficult. It is commonplace in Africa to find that the working member of the family takes care of the non-working members of the family. The hypothesis 'there is no significant relationship between COVID-19 and the economic challenges of the seafarers' was confirmed implying economic challenges (Unemployment; Sack; salary slash; low demand for sea transportation; imbalance between salary and expenses; can't pay rents) faced by the seafarers during the covid-19 lockdowns and proceeded from the pandemic.

The K-Wallis test outcome for the spatial difference in the social challenges encountered by the seafarers (Fatigue; sleeping disorders; loneliness; home missing & isolation; limited recreation; excessive anger; fights onboard; Depression; Anxiety; suicide intention; feeling sick; panic & life's uncertainty) showed Kruskal Wallis H of 27.8 and the *Asymp. Sig* of 0.000 at $P < 0.05$. This was a particularly surprising result, as the lockdowns were thought to have the same or similar effects on the seafarers.

Also, the K-Wallis test outcome for the spatial difference in the economic challenges encountered by the seafarers, revealed that there was a significant spatial variation in the economic challenges posed by COVID-19 on seafarers in the study area; at Kruskal Wallis H of 17.5 and the *Asymp. Sig* of 0.007 at $P < 0.05$. This is not surprising, as the approaches to workers' welfare in the area may be different. As such the outcomes of the economic effects of COVID-19 can be different.

These results imply that the workers' welfare is poor. There is also an acute lack of psychological programmes that should cater to seafarers in the event of such pandemics or exigencies. Also implied by the study is that there is a need to consider the salaries of the workers. The study found that there was serious financial stress among seafarers, resulting from salaries not being able to handle their financial challenges. There is thus, a need for the seafarers to develop a serious pressure group which should among other things demand a better working environment for the seafarers. On the other hand, the shipping line must factor in workers' welfare and resilient coping mechanisms for staff and maintain that such coping strategies be imbibed by training and courses. More importantly, the regulators (NIMASA), need to do more than they are currently doing. The agency should look beyond company or shipping line compliance to regulations and include workers' welfare in their purview.

Nevertheless, this study has some inadequacies that need to be mentioned. The researchers were not allowed to access the owners of the shipping companies. The fear as claimed, was that they didn't want to divulge too much information into the volatile public domain at the time of conducting this study. It is, therefore, advanced in this study that this area be included in future research so that the reasons behind the behavior of the proprietors towards the seafarers be unmasked.

This study concluded by stating that the COVID-19 pandemic had and still portend serious social and economic challenges for seafarers. Capacity building for and interaction with, the seafarers will aid the coping capacity of seafarers; while creating a sustainable system of welfare for them in the long run.

Author contribution statement

Ozabor Famous: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Efe Sunday Ighovie; Obisesan Adekunle: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Kpang Meelubari, Berenua Tsaro: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

Data will be made available on request.

Additional information

No additional information is available for this paper.

Recommendations

Cascading on the findings of the current study the following are recommended.

- a) there is a need for the companies (shipping companies), to create a counseling unit, to cater to the psychological and economic challenges of seafarers at difficult and crucial times, such as the COVID-19 period.
- b) the regulators of the shipping industry must improve on their task on the shipping companies to improve workers' welfare.
- c) seminars on financial management in difficult times should be organized by shipping companies and regulatory agencies from time to time.
- d) a coping strategic plan should be initiated for coping with infectious and deadly diseases. This can be achieved by a synergistic approach, between the regulatory agencies and the shipping lines. Nongovernmental agencies may be included in the capacity development and application.

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Declaration of competing interest

The authors state clearly and with no duress that they do not know about competing financial interests or relationships with the possibility of influencing this paper in part or whole.

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