
RESEARCH ARTICLE

Impacts of the COVID-19 Pandemic on Artisanal Fisheries and Education in The Gambia

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ABSTRACT

The Gambia is one of the least developed countries in sub-Saharan Africa. In response to the COVID-19 outbreak, the Gambian government implemented a lockdown and various restrictions in 2020, but the impacts on Gambians' livelihood remained unclear. With the gradual relaxation of the lockdown and restrictions, we were able to conduct the first questionnaire surveys to interview 140 fishermen, 140 fishmongers and 80 customers in the artisanal fisheries sector, and 150 students (grade 9-12) and 14 teachers in the education sector, to assess the impact of the pandemic on their socio-economic and personal well-being. Both fishermen and fishmongers experienced a drop in sales, whereas customers had to pay more during the pandemic. Illegal fishing, lack of policy and regulations and price hikes were among the main concerns for the artisanal fisheries sector, although the respondents did not feel a change in their personal well-being due to the pandemic. Students and teachers did not have the necessary training or resources to conduct remote learning during the pandemic, and both attendance and academic performance declined as a result. Access to the internet and learning materials was very limited, and 10% of the students ceased learning activities altogether. 19% of students and 50% of teachers experienced poor mental health during the pandemic. The majority of the students were concerned about the impact of the pandemic on their education, whereas most teachers were concerned about their finances and psychological conditions. Nearly a quarter of the students relied on unofficial channels to learn about the pandemic, making them susceptible to misinformation. To safeguard Gambian's well-being against future pandemics or similar large-scale disruptions, we recommend better fishery monitoring and policy enforcement, more fish storage facilities, improving digital learning capacity, providing mental health care in schools, and devising effective communication campaigns about the pandemic.

KEYWORDS

The Gambia, COVID-19 pandemic, Artisanal fisheries, Education

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1. Introduction

Since the first report of the novel coronavirus in Wuhan, Hubei Province, China, in December 2019, cases of infection have continued to rise worldwide, and governments are struggling to respond to this global pandemic. As of 11 March 2022, there have been more than 454 million coronavirus cases and over 6 million deaths worldwide (Worldometers; <https://www.worldometers.info/coronavirus>). On the continent of Africa, over 11 million cases and over 251 thousand deaths have been reported (Worldometers; <https://www.worldometers.info/coronavirus>). The Gambia reported its first case on 17 March 2020; to date, about 11,963 cases have been confirmed and 365 deaths reported by its Ministry of Health (<https://www.moh.gov.gm/covid-19-report/>). In an effort to control the spread of the virus, the Gambian government implemented several restrictions between March and October 2020, ranging from the closure of borders, restaurants and schools to limiting opening hours for essential businesses such as grocery stores and petrol stations. The mandatory quarantines and restrictions have caused The Gambia's economy to shrink by 0.2% (ITA; <https://www.trade.gov/country-commercial-guides/gambia-market-overview>).

The Gambia is a low-income riverine country located in the western part of mainland Africa and is among the most densely populated countries on the continent (World Bank; <https://www.worldbank.org/en/country/gambia/overview#1>). Its economy is heavily dependent on agriculture (crops and livestock), fisheries and tourism (ITA; <https://www.trade.gov/country-commercial-guides/gambia-market-overview>). An estimated 200,000 people are employed in fisheries and affiliated sectors (Mendy, 2003). The Gambia's Economic Exclusive Zone covers an area of about 10,500 km² including about 4,000 km² of the continental shelf. It is rich in biodiversity, with over 500 species of demersal and pelagic fish (European Commission, 2021), thanks to a seasonal upwelling, a wide continental shelf, and strong river discharge from the River Gambia (Aristegui et al., 2009). Most Gambians live along the 80 km coastline, with fishing an integral part of their life (Belhabib et al., 2016). Artisanal fisheries represent around 20% of the total catch, while almost 80% of the catch is controlled by foreign fleets (Belhabib et al., 2016). Despite its small scale, artisanal fisheries provide 90 percent of the national fish consumption (UNCTAD, 2014) and fish accounts for about 51% of Gambian's protein intake (Kawarazuka et al., 2011).

The artisanal fisheries sector employs, directly and indirectly, an estimated 25-30,000 people, and there are an estimated 6,104 artisanal fishermen operating along the Atlantic coast (UNCTAD, 2014), using motored and man-powered dug-out canoes and fishing gears such as gill nets, line hooks and single line hooks. Most of the catch is sold locally, and there is an increasing demand for high-value species such as sole, snapper and cephalopod (Ragusa, 2014). There are eleven landing sites along the Atlantic coast, but only four are equipped with ice-making facilities and cold storage. Fishermen unload their catch daily at the landing sites, where fishmongers buy the fish. There are two types of fishmongers, the "banabana", who are mostly males, and smaller intermediate distributors, who are mostly women. Women play an important role in the trade and make up about 50% of the fishmongers. An estimated 30% of the fish landed is traditionally processed, either dried and/or smoked, and 80% of fish processing is done by women (African Development Bank, 1999). Fishmongers, in turn, sell to consumers in the local markets, usually opposite the landing sites. For many fishermen and fishmongers, artisanal fisheries are their principal or sole source of income. As a result of lockdown and travel restrictions due to the pandemic, fishery activities decreased noticeably among the coastal communities, although the socioeconomic and wellbeing effects on the local populace have not been studied.

Lockdown and travel restrictions due to the COVID-19 pandemic have also affected education world-wide (Reimers, 2022). Teachers and students had to rely on remote learning technology and had to adapt to a new way of teaching and learning (Dhawan, 2020; Mishra et al., 2020). The long-term effects of the pandemic on education may not be fully known for some time, but there is evidence that students have suffered from lack of support, lack of social interactions, and impeded progression (Outhwaite et al., 2020; Putri et al., 2020; Mahapatra et al., 2021). Gambian students are particularly vulnerable to school closure because of limited availability of resources (e.g., books, stationery), technology (e.g., smartphones, computers) and services (internet, electricity); school teachers also may not be equipped to teach remotely. Yet, the impacts of the COVID-19 pandemic on education in The Gambia remain unclear.

The mandatory lockdown and travel restrictions have begun to ease since October 2020 in The Gambia. With the gradual return of fishery activities and re-opening of schools, we had the opportunity to conduct the first questionnaire surveys to assess the impacts of the COVID-19 restrictions on artisanal fisheries and education in The Gambia. The data will be vital for providing guidance on preparing for and mitigating similar impacts in the future.

2. Literature Review

Marine fisheries play an important role in the economies and livelihood of the inhabitants of coastal states globally. The West African coast comprises some of the most productive fisheries ecosystems in the world, encompassed within three Large Marine Ecosystems (LME) (Belhabib, 2016), whose fisheries are sources of food, employment, revenue through license fees and fishery agreements, and is a substantial source of foreign exchange (FAO, 2006; Agnew et al., 2010). The Canary Current, which flows southwest about as far as Senegal, is known for its geographical diversity, high productivity and fisheries abundance due to a seasonal upwelling and strong river discharge enriching the waters of the Canary Current Large Marine Ecosystem (Aristegui et al., 2009). These factors are represented on The Gambia's coast, and the distinct shape of The Gambia implies that most Gambians live along the coast and river banks, thus making fishing an integral livelihood.

The artisanal fisheries of The Gambia consist of relatively extensive, low-capital fishing practices. Despite its small-scale operation, the artisanal sector provides about 90 percent of the total national fish consumption and is the main source of raw material for the industrial sector (UNCTAD 2014). This sub-sector also supplies about 80 percent of output in the industrial fisheries processing plants (UNCTAD 2014).

The COVID-19 pandemic and subsequent restrictions have created health and economic crisis, leading to increasing poverty (Sumner et al., 2020) and growing food and nutrition insecurity (WFP, 2020). Fisheries experienced severe impacts, with many fishing fleets registering a substantial decline in activity during the early part of 2020 (Bennet et al., 2020). The pandemic caused

significant disruptions to food supply chains at multiple levels around the world, including The Gambia, and seafood supply chains were no exception (Béné, 2020).

As governments enforced closure of facilities, travel restrictions and social distancing, schools were required to make quick changes to the learning environment and process in order to continue to provide education services. This included the use of remote learning technology and adopting new formats of teaching and learning (Dhawan, 2020; Mishra et al., 2020). In the Global North, 'remote learning' is synonymous with the use of the internet, interactive communication platforms (e.g. Zoom, Team) and online education platforms (e.g. Blackboard, Canvas, Google Classroom). Successful transition to remote learning requires good infrastructure (e.g. internet coverage, access to technology), a great deal of preparation and training (e.g. converting physical learning material to online material, training to use the different platforms), and for both teachers and students to adapt to the new format (Ali, 2020). However, even in socioeconomically and technologically advanced countries, some students and teachers still find themselves ill-prepared to make the hasty transition to remote learning (Blikstad-Balas et al., 2022; Iwabuchi et al., 2022; Lavonen and Salmela-Aro, 2020).

Developing countries in the Global South lag behind in infrastructure, resources and training. For example, only 7.7% of households in all of Africa had a computer in 2019 (source: www.statista.com/). Personal mobile phones are more widespread. According to International Telecommunication Union, mobile network coverage in The Gambia was at 94% (2016 figure). This figure, however, obscures the fact that most of the coverage is concentrated in the capital city of Banjul and the surrounding areas, whereas the north bank and the rural areas along the River Gambia have no very poor mobile service (source: www.nperf.com). Less than 40% of the Gambians have access to the internet, and only 0.21% have a broad band (source: www.worlddata.info), and most of the mobile service subscriptions are in only 2G or 3G, which does not support existing online interactive learning platforms, and heavy usage of mobile data for remote learning may make it prohibitively costly to individuals. Because of a chronic shortage of infrastructure, technology, resources and training, teachers and students in The Gambia were ill prepared to transition to remote learning. For these reasons, the pandemic has further exposed global education and digital disparity (Jacob and Holsinger, 2008; Ragnedda and Gladkova, 2020).

3. Methodology

3.1 Artisanal fisheries

The first survey was focused on artisanal fisheries and was conducted between June and July 2021 along the 80 km coastline, where seven of the most popular fish landing sites (out of eleven) are located (Suppl. Fig. S1). Some of the sites (Tanjai and Bakau) are highly populated, while other sites are less populated (Bijilo and Kartong) (Table 1). Data were collected using questionnaires to interview fishermen, fishmongers and consumers individually. The questionnaires were pilot-tested with a small sample of respondents and then modified and finalised accordingly. The questionnaires captured both qualitative and quantitative data concerning their livelihood pre-COVID and during the COVID-19 pandemic, including demographic data, fishing method, type and volume of transactions, income and general wellbeing. The questionnaires were created in English and then translated into the local languages (mainly Wolof and Mandinka) for those that did not understand English. Interviewers who speak the local languages received training on how to conduct the interviews and recorded the information in a consistent manner. Understanding local culture and customs were critical to successful interviews; therefore, male interviewers were sent to interview male respondents, and females to interview female respondents. The team randomly selected and interviewed a total of 140 fishermen, 140 fishmongers, and 80 consumers during the market opening hours.

Location	GPS Co-ordinates	Population	Market
Banjul	N13°27'20.5" W16°34'15.5"	34,589	Yes
Bakau	N13°28'55.0" W16°40'35.8"	43,098	Yes
Brufut	N13°23'08.3" W16°46'30.9"	N/A	Yes
Tanji	N13°21'24.0" W16°47'57.1"	N/A	Yes
Sanyang	N13°15'48.4" W16°47'23.9"	N/A	No
Gunjur	N13°09'11.2" W16°46'44.2"	14,088	No
Kartong	N13°04'24.9" W16°44'36.3"	N/A	Yes

Table 1. Geographical information of the fish landing sites (worldpopulationreview.com).

3.2 Education

The second part of the study was focused on the impact of COVID-19 on education. A questionnaire survey was conducted in November 2021 at 5 schools located in the west coast region (Suppl. Fig. S2). Students were interviewed during school hours in groups to assess their primary mode of learning, attendance, access to educational resources and technology, access to COVID-19 information, as well as personal wellbeing. Teachers, where available, were interviewed as a separate group. Because the students and teachers were able to communicate in English, questions and answers were verbalized in English. The team conducted

interviews in five schools for a total of 150 students covering grades 9 to 12. Only two schools with a total of 14 teachers were available for the interview.

4. Results

4.1 Artisanal fishery survey

The demographic data of the respondents are presented in Supplementary Table S1. The sample size of the consumers is less than the fishermen and fishmongers because not all fish landing sites have markets nearby. Respondents' answers to the questionnaire questions are reported in percentages.

The primary fishing gear used by the fishermen was gillnets both before and during the pandemic (73%). Most fishermen sold only to fishmongers (78%). There was only a 1.5% increase in selling directly to consumers and a 3% increase in selling to both consumers and fishmongers during the pandemic. The primary type of fishmonger was banabana (58%), and about 57% of fishmongers buy fish from the fisherman and rarely buy fish from other fishmongers; no large changes were noted during the pandemic. Fishmongers usually sold to individual consumers (38%), retailers (30%), or both (32%) before the pandemic, and this did not change much during the pandemic. Although the top five fish species caught or bought remained the same (Suppl. Table S2), fishermen, fishmongers and consumers all noted a decrease in the availability of barracuda, lady fish and sompat during the pandemic.

There was a change in the quantity of fish caught by the fishermen (Fig. 1a). Before the pandemic, 22% of the fishermen caught 50+ baskets of fish per day, but this dropped to 12% during the pandemic. Meanwhile, fishermen catching less than 10 baskets per day rose from 36% to 47% during the pandemic. The value of the fish also changed during the pandemic (Fig. 1b): 16% of their transactions switched from high-value (D3000 to >D5000 per basket) to low-value sales (<D1000 to D3000 per basket). Before the pandemic, 33% of the fishmongers purchased 10+ baskets of fish per week, but this decreased to 27% during the pandemic; conversely, the percentage of fishmongers who bought only 1-3 baskets increased from 44% to 60% during the pandemic (Fig. 1c). Meanwhile, consumers overall had to pay more for the fish: Low-price transactions (<D25 to D50 per bunch) decreased from 24% to 17%, whereas high-price transactions (D75 to >D100 per bunch) increased from 66% to 70% during the pandemic (Fig. 1d).

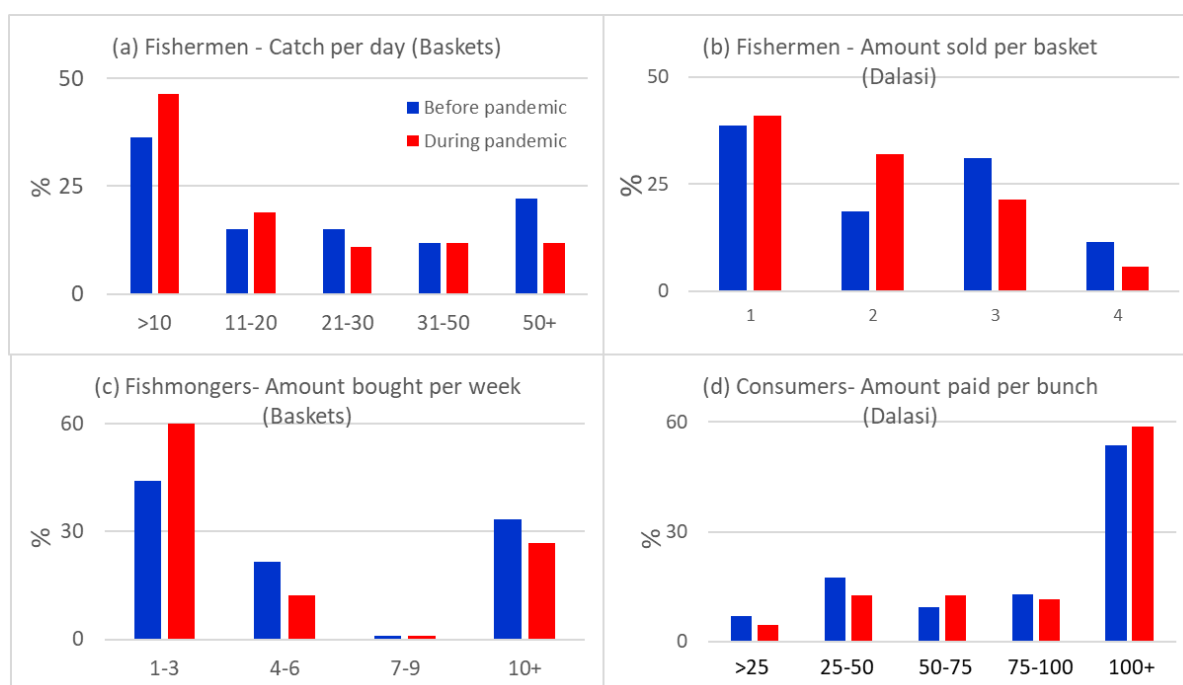


Fig. 1. Fishery survey results: (a) Amount of fish caught by fishermen, (b) Amount of fish sold by fishermen, (c) Amount of fish purchased by fishmongers, and (d) Amount of fish purchased by consumers before and during the COVID-19 pandemic. The Colour coding of data is the same for all subsequent graphs unless indicated otherwise.

When describing the business, 37% of the fishermen rated their business as very high before the pandemic, and only 5% felt so during the pandemic. In contrast, fishermen rating their business as low to very low ballooned from 6% to 39% during the pandemic (Fig. 2a). 98-99% of the fisherman described their wellbeing to be medium to very high before and during the pandemic (Fig.

2b). The majority (88%) of the fishmongers rated their business high to very high before the pandemic, but this drastically dropped to 20% during the pandemic. Meanwhile, the rating of businesses as low to very low rose from 4% to 52% during the pandemic (Fig. 2c). Nevertheless, 82-92% of the fishmongers rated their wellbeing to be high to very high before and during the pandemic (Fig. 2d). Likewise, 81-88% of the consumers' wellbeing was rated high to very high before and during the pandemic.

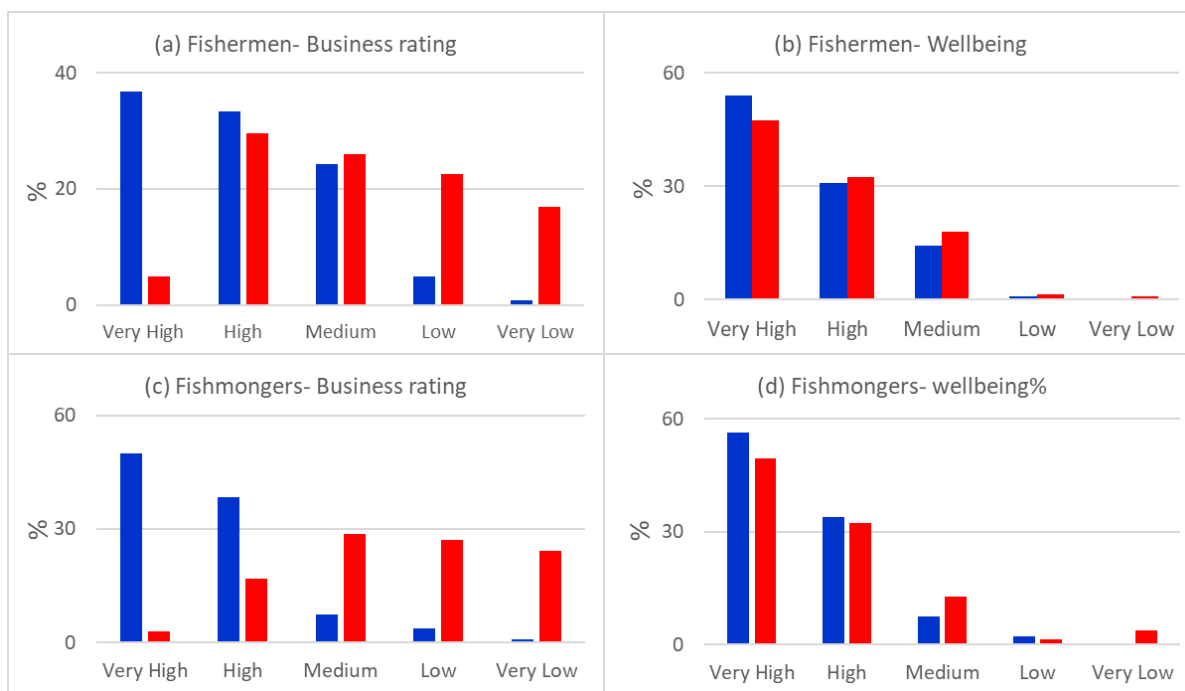


Fig. 2. Fishery survey results: (a) Rating of business and (b) Rating of personal wellbeing by fishermen; (c) Rating of business and (d) Rating of personal wellbeing by fishmongers, before and during the COVID-19 pandemic.

The respondents were asked what other main concerns they had during the pandemic. Among the fishermen, their concerns were illegal fishing (e.g., fishing without a permit or using destructive fishing methods), overfishing, lack of fishery policy, customer unavailability, and high fuel prices. The fishmongers were concerned about customer unavailability, high prices, inadequate fish, inadequate storage facility, and lack of price regulations. The consumers were concerned about high prices and inadequate fish.

4.2 Education survey

The demographic data of the respondents are presented in Table 2. Students' answers to the questionnaire are reported in percentages. Because of the small sample size of teachers, we only highlight teachers' responses in the text where appropriate.

Student				
Gender	62 males		88 females	
Grade	9 th	10 th	11 th	12 th
	50	11	50	39
Nationality	147 Gambian		1 Senegalese	
Teacher				
Gender	13 males		1 female	
Nationality	All Gambian			

Table 2. Demographic data of respondents in education survey.

The primary mode of learning among the students was in-person learning before the pandemic (92%); this switched to mostly remote learning (74%) during the pandemic. Most notably, 10% of the respondents indicated that they ceased learning during that pandemic (Fig. 3a). Only 7% of the teacher respondents used remote teaching (in hybrid mode), and 29% of them ceased

teaching during the pandemic. Students self-assessed that their attendance to learning activities dropped from being excellent (97%) to average and poor (57% and 42%, respectively) during the pandemic (Fig. 3b). This was supported by the teachers' responses, 29% of whom indicated that student attendance was poor during the pandemic.

The majority of the students (82-83%) indicated that they did not have access to training and resources for remote learning (Fig. 3c). Interestingly, most of them had access to the internet at home (79%) but not in school (73%) (Fig. 3d). None of the teachers we interviewed indicated that they had the relevant training and resources for remote teaching, or access to the internet at home.

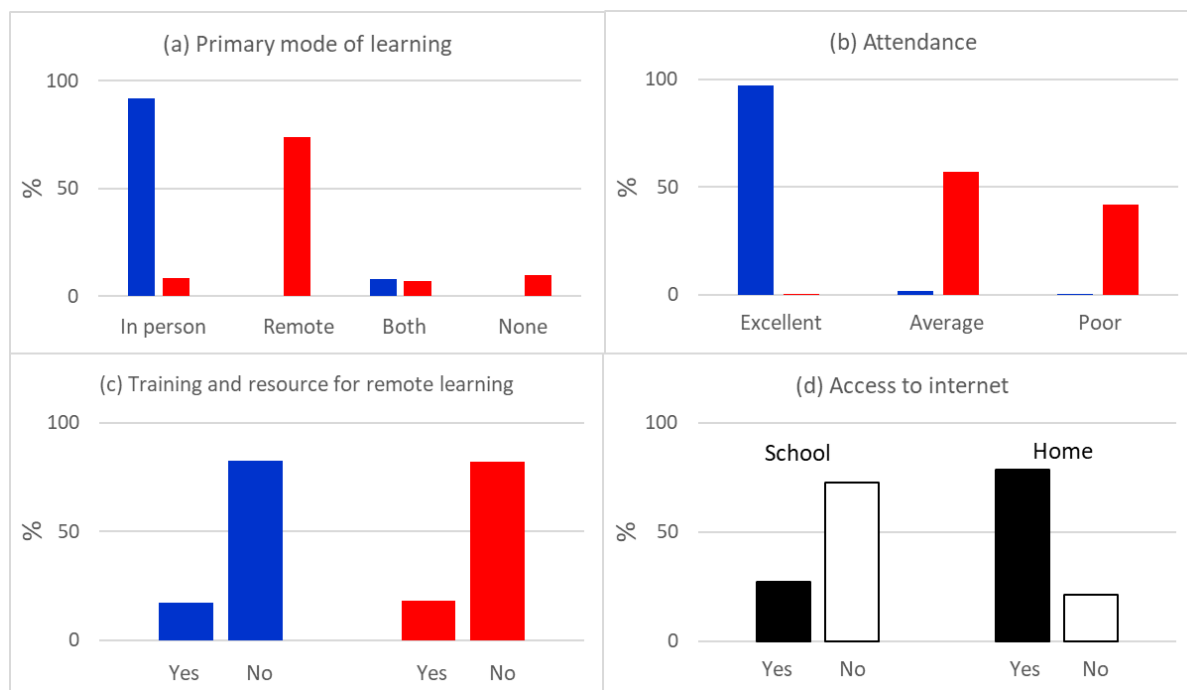


Fig. 3. Education survey results: (a) Students' primary mode of learning, (b) Attendance and (c) Access to training and resources for remote learning before and during the COVID-19 pandemic. Students' access to training and resources for remote learning before and during the COVID-19 pandemic, and (d) Access to the internet in school vs. home.

Students' perception of teachers' performance showed a large swing, from 87% excellent before the pandemic to 97% average-to-poor during the pandemic (Suppl. Fig. S3). Meanwhile, teachers rating students' academic performance as poor jumped from 0% to 79% (Suppl. Fig. S3).

Students who rated access to physical learning materials such as books and stationery as "poor" rose from 2% to 32% during the pandemic (Fig. 4a). This was largely echoed by the teachers, 43% of whom rated the access "poor" during the pandemic (in contrast to 0% before the pandemic). It is common for many Gambian students to attend after school classes for remedial learning, but such attendance dropped precipitously from 67% to 15% during the pandemic (Fig. 4b), even though most of the teachers we interviewed continued to offer after school classes (86% before vs. 71% during the pandemic).

While most student respondents (and 100% of the teacher respondents) considered themselves in average to excellent physical health (Fig. 4c), students feeling excellent mental health decreased from 81% to 41%, whereas students feeling poor mental health increased from 4% to 19% during the pandemic (Fig. 4d). The situation appeared to be worse for the teachers, with 50% of them claiming poor mental health during the pandemic.

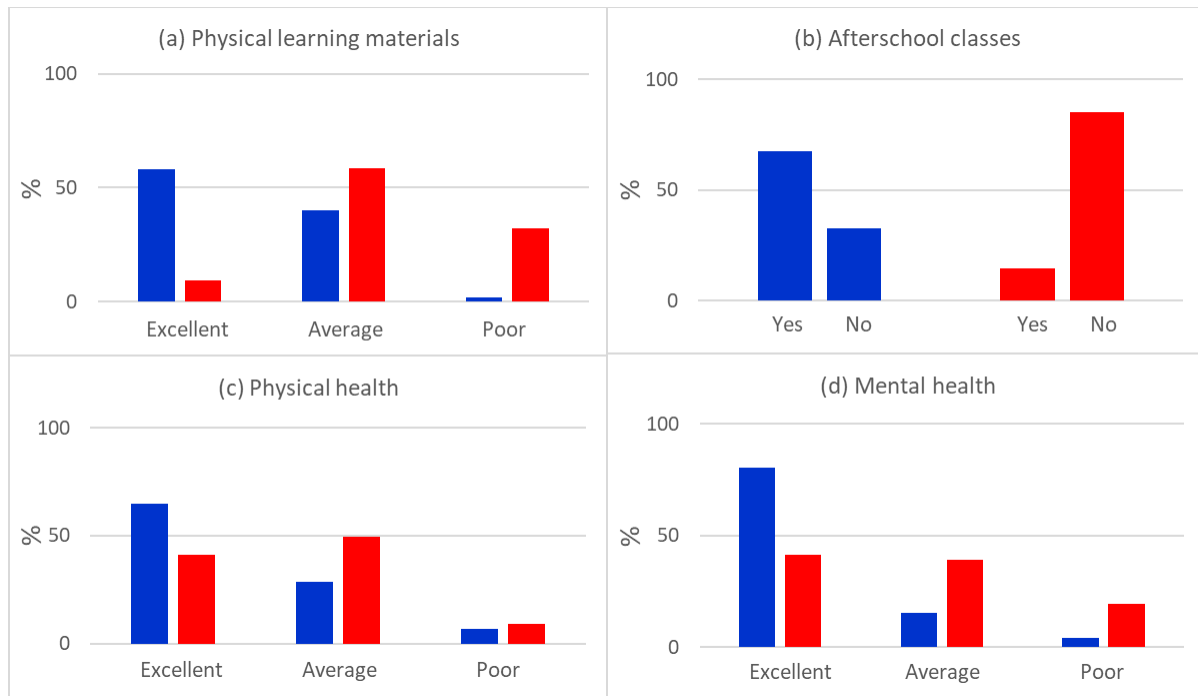


Fig. 4. Education survey results: (a) Students’ access to physical learning materials, (b) Attendance of afterschool classes, (c) Rating of own physical health, and (d) Rating of own mental health before and during the COVID-19 pandemic.

We asked the respondents which was the most important way that the pandemic had affected them and which information source they relied on to learn about the pandemic. Among the student respondents, the vast majority (83%) cited education as the most impacted part of their life, whereas the teacher respondents cited financial and psychological effects (64%) and movement restriction (29%). Most students learned about the pandemic from the Gambian government (42%) and international organisations such as WHO (33%), but 24% of them still relied on unofficial information sources such as local community members, friends, neighbours, internet and family members. In contrast, the overwhelming majority of the teacher respondents (93%) relied on the government for information about the pandemic.

5. Conclusion

The COVID-19 pandemic has created global health and socioeconomic crises and increased poverty (Love et al., 2021; Summer et al., 2020). The pandemic has also further exposed global inequality, where a developing country like The Gambia would have very limited capabilities to respond and recover (Ghosh, 2020). This study was the first to assess the effects of the COVID-19 pandemic on artisanal fisheries and education in The Gambia.

5.1 COVID-19 impacts on artisanal fisheries

The survey found that while most of the respondents did not feel their personal wellbeing was affected, the majority of the fishermen and fishmongers experienced poorer business during the pandemic. Fishermen reported a decrease in fish catch and a 16% decrease in high-value sales during the pandemic. The quantity of fish purchased by fishmongers decreased as well. This may explain why both fishermen and fishmongers downrated their businesses during the pandemic. Respondents claimed a decrease in the quantity of certain species, and consumers had to pay more for the fish.

We found that the sale and marketing practices of the artisanal fishery sector remained largely unchanged by the pandemic, where fishermen mainly sold to fishmongers, who in turn sold to consumers at the local markets. There was only a 1% increase in the direct sales from fishermen to consumers during the pandemic; therefore, there was no attempt to implement alternative practices to increase sales or widen the market, unlike the adaptive responses by the fisheries sector in other countries. In the north-eastern part of the United States, many fishermen developed alternative marketing or distribution programs for their products (Smith et al., 2020). One example is the growing trend in direct-to-consumer sales, which shortens the supply chain and increases profits. In Peru, fishing associations took on commercial and marketing roles to diversify their distribution strategies to minimize disruptions to the fisheries' supply chains (Bassett et al., 2021). At the beginning of the COVID-19 pandemic, networks were created in low-middle income countries to share information, document impacts and advocate for government resources. As governments responded to the economic crisis caused by the pandemic, African countries like Kenya, Somalia, South Africa and Uganda have

developed adaptive mechanisms to increase direct producer-to-consumer sales through community-supported fisheries and similar models (Love et al., 2021).

5.2 Recommendations based on the artisanal fishery survey

Based on our survey results, we have some recommendations to better prepare the artisanal fisheries sector for future pandemics or similar large-scale disruptions:

- Increase monitoring and policing against illegal fishing. One particular concern expressed by the fishermen was an increase in illegal trawling along the coast during the pandemic, likely encouraged by inadequate monitoring and policing during the lockdown. Illegal fishing can be detrimental to the livelihood of coastal communities and the effort to manage and support sustainable fisheries (Pauly, 1998; Zeller et al., 2007; Belhabib et al., 2016). In The Gambia, an estimated 12% of the catch in 2010 was illegal (Agnew et al., 2010), but since then, there has been no study of illegal fishing, which hampers proper assessment and management of fish stocks.
- Update the 2009 Catch Assessment Survey. Although the demersal stocks are said to be overexploited, the estimated sustainable yield for pelagic fish species (excluding bonga) is said to be between 50,000 to 60,000 tonnes per year (UNCTAD, 2014). New and more rigorous data are needed to help The Gambia monitor fish catches, develop and evaluate policies and fishery management plans, and develop an evaluation framework and resilience indicators for the seafood value chain.
- Diversify the sales practice. Conventional market sales took a hit from lockdown and travel restrictions during the pandemic. In response, some businesses introduce new marketing and sale strategies, including direct door-to-door delivery (Bennett et al., 2020). The Gambian fishery sector could introduce a similar direct delivery service to compensate for the decreased foot-traffic at the local market during a pandemic.
- Provide economic relief for large scale disruptions. In the Global North, governments take lessons learnt from current and past global crises to build resilience against future large-scale disturbances (Love et al., 2021). For example, Canada and Russia classify the fishing industry employees as “essential workers,” which qualifies them for social protection to lessen the socioeconomic toll of the pandemic (Love et al., 2021). The Gambia would benefit from creating economic relief packages for artisanal fisheries to increase food security and protect the livelihood of the communities that depend on this sector.
- Create more icing and storage facilities at each fish landing site. Proper icing and storage facilities will extend the shelf-life of the fish and allow more efficient distribution to even rural areas where the residents may not be able to travel to the fish markets.
- Create information sharing and collaborative networks. The Gambia could benefit by sharing information and collaborating with other countries in the region to build resilience against future pandemics and similar disruptions.

5.3 COVID-19 impacts on education

The COVID-19 pandemic forced schools around the world to make quick changes from in-person learning to remote learning, and it is no exception for The Gambia. However, while socioeconomically and technologically advanced countries may be better prepared to make the transition, teachers and students in the Global South suddenly found themselves struggling to respond to the fast-developing pandemic.

Our survey found that the majority of the Gambian students lacked the necessary support to do remote learning. Most of the students we interviewed did not have access to the internet in school, which may have limited their development of digital learning skills. Meanwhile, school closure and travel restrictions also denied them access to physical learning materials such as books and stationery, as most Gambian students cannot afford to buy their own. Equally troubling is that none of the teachers we interviewed appeared to be equipped to do remote teaching. The lack of proper training and support may have led to poor performance ratings, poor attendance, and the fact that some students and teachers ceased schooling activities altogether during the pandemic. Normally, students who struggle can get help in afterschool remedial classes, but the attendance of after school classes also dropped off significantly, which could further impede their academic progress.

The COVID-19 pandemic has created unprecedented challenges for societies (Lancet Public Health, 2020). Isolation, movement restrictions, drastic change in the way of life, and continuous anxiety can negatively affect an individual’s physical as well as mental health (Dai et al., 2021; Kumar and Nayar, 2021). Our surveys found that while most of the respondents reported average to excellent physical health, concerns about education (students) and financial and psychological effects (teachers) due to the pandemic appeared to have taken a toll on their mental health. In the Global North, governments recognise the importance of mental wellbeing, especially during the COVID-19 pandemic, and have increased their support accordingly (UK Department for Education; <https://www.gov.uk/government/news/schools-and-colleges-to-benefit-from-boost-in-expert-mental-health-support>). In the UK for example, school nurses can provide mental health advice; students and teachers can access specialised mental health professionals through the National Health Service, and the government also provides learning materials to promote

mental wellbeing. Unfortunately, mental health support and resources are virtually non-existent in Gambian schools, and local culture may make it difficult for people to seek proper mental health treatments (Kretzschmar et al., 2021).

As governments and health authorities continue to battle the COVID-19 pandemic, successful implementation of testing, immunization programs and public health protocols require accurate and effective communications to gain the public's trust (Moore et al., 2020). The importance of this issue is laid bare by the fact that misinformation on social media has been spreading rapidly and is threatening to derail the efforts to control the pandemic (Islam et al., 2020; Kouzy et al., 2020). Our survey found that while the majority of the respondents learned about the pandemic through official channels such as the Gambian government and WHO, a sizable percentage of the students (24%) still relied on informal sources, which could make them susceptible to misinformation.

5.4 Recommendations based on the education survey

Based on our survey results, we have several recommendations to better prepare the education sector for future pandemics or similar large-scale disruptions:

- Improve the infrastructure, resources and training for the use of digital technology for learning and teaching. Even before the pandemic, there has been a global movement to encourage online education (Li and Lalani, 2020); one may argue that the COVID-19 pandemic accelerated the process. Although travel restrictions are beginning to ease in many countries, many schools still retain some elements of online learning, as it is seen to be necessary to prepare students for the evolving global economy (Gibbons, 2021). New waves of COVID-19 variants may still require more school closures when students can ill afford more disruptions to their education. It is imperative that students and teachers are given the support they need to do remote education.
- Implement mental wellbeing training and care. For many people, the COVID-19 pandemic is an unparalleled challenge in their lifetime, and the longer the pandemic continues, the larger the toll it would have on people's mental health (Kumar and Nayar, 2021). The lack of mental health care in The Gambia could delay a full recovery from the pandemic. While it may take years to establish a mental health profession in the country, schools may offer basic mental wellbeing awareness training, simple counselling and early interventions (Weare, 2015).
- Organize an effective information campaign. In the age of social media, misinformation can spread fast and far, sometimes with dire consequences. A multi-national study has suggested that susceptibility to COVID-19 misinformation can be related to many factors, such as the individual's level of numeracy, political leaning, ethnicity, age, gender, and preferred source of information (Roozenbeek et al., 2020). Nevertheless, the study also highlighted that trust in scientists could significantly decrease the public's susceptibility to misinformation and increase their likelihood of being vaccinated (Roozenbeek et al., 2020). As such, it is important to deploy scientists to communicate open and transparent scientific information to the public and find ways to improve the public's numeracy and critical thinking skills.

The COVID-19 pandemic is the first global health crisis in over 100 years and has caused the worst economic crisis since the Great Depression (Loayza, 2020; Siddiqui, 2020). The highly contagious virus spreads at an alarming rate, with infection increasing from only 44 cases to 117 million within the first 15 months. This fast-spreading pandemic has exposed the wide chasm among countries in their capacity to respond and manage the crisis within a short period of time. While some governments are able to quickly mobilize resources to offer financial aid to businesses and individuals, implement large-scale testing, vaccination and medical care programs, transition to remote working or learning schemes and provide social services, developing countries often lack the resources and knowledge to do so, and their citizens suffer worse as a result. This study assessed the impacts of the COVID-19 pandemic on artisanal fisheries and education in The Gambia. The data should provide insights to help the government, international organisations, academic institutions, civic societies and individuals to better understand the vulnerability of the Gambian society to future catastrophes. We have also proposed several measures for decision makers and stakeholders that will build resilience against future crises.

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