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IMPACTS OF CORONAVIRUS ON ILLEGAL WILDLIFE TRADE IN SOUTHWEST NIGERIA

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Abstract
This study measured the awareness, perception and attitude of residents in southwest Nigeria on the impact of coronavirus on illegal wildlife trade with an online survey method for data collection. One hundred and fifty responses were recorded out of over two hundred online copies of questionnaire sent out. The Cronbach's alpha was above 0.70 for the questionnaire items for perception and conservation attitudes which is an indication of reliability. Results were presented descriptively using frequencies, percentages and tables while inferentially, chi square was used to test the relationship between socio-demographic characteristics, perception and conservation attitude. ANOVA was used to check for differences in the respondents' willingness to support conservation among their socio-demographic characteristics. A higher percentage of the respondents were females (54.7%), though almost equal with males (45.3%). The highest percentage of the respondents were within youthful age of 21-30 years (80.7%) with tertiary education level (99.3%). Furthermore, majority of the respondents were students (37.3%) and with income below ₦50,000 (61.3%). Although, majority of the respondents disagreed with the fact that Covid-19 was contracted from wildlife, they perceived that the pandemic has reduced human impact on wild animals' habitat and they are willing to support conservation by reporting anyone involved in illegal hunting and trade in wildlife. Strict laws to reduce illegal wildlife trade and wild animals-human contact should be enforced as this will reduce the transmission of zoonotic diseases.

Key Words: *Coronavirus, Wildlife, Illegal trade, Conservation*

Introduction

The breakout of the Coronavirus disease (COVID-19) is a major health crisis that has been categorised as a pandemic by the World Health Organization (WHO, 2020b). COVID-19 is caused by a novel virus: The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (Wu and McGoogan, 2020). On December 31, 2019, the World Health Organization (WHO) reported an epidemic with unidentified aetiology (Deepak *et al*., 2020) from Wuhan, Hubei, China (Zhu *et al.,* 2020), and it spread very quickly across the world in the first four months of

2020, affecting residents in over 200 countries and impacting entire communities, societies and economies. The emergence and spread of this novel and harmful respiratory disease had a huge impact on both human health as well as the global economy (Sahu *et al.,* 2020). The first known occurrence on the severe illness caused by a coronavirus was reported in 2003, and it was called "Severe Acute Respiratory Syndrome" (SARS) that led to a severe epidemic in China (W.H.O., 2020c). A second severe epidemic by a coronavirus was reported in 2012 in Saudi Arabia, and it was named the "Middle East Respiratory Syndrome" (MERS) (W.H.O., 2020a). The present coronavirus disease which is the third severe case is found to be a mutated form of its two forms earlier reported. (Yao *et al*., 2020).

COVID-19 is potentially related to a zoonotic pathogen in wild bats, which may have spread to humans, likely through an intermediary, according to ongoing studies (Dhama *et al*., 2020). This intermediate source has not been identified. However, it has been proposed that it may have been a pangolin (*Manis* sp.), (Zhang *et al.,* 2020), though the scientific evidence for this is still a controversy. (Liu *et al.,* 2020). Pangolins are the most heavily trafficked mammals in the world and have been smuggled repeatedly into China where they are valued for food and supposed medicinal purposes. In 2019, Singaporean authorities made a seizure of 25 tonnes of African pangolin scales (equal to almost 50,000 animals at a black-market value of US$7 million), shipped from Nigeria and headed for China and Viet Nam. (UNODC, 2019). This clearly demonstrates the transnational nature of wildlife trafficking, threatening not only biodiversity, but also biosafety with long-term health, security and economic repercussion. Coronaviruses related to SARS-CoV-2 have been identified from smuggled Sunda pangolins (*Manis javanica*) confiscated in southern China. (Lam *et al.,* 2020).

Measures such as travel ban taken to control and reduce the widespread transmission of COVID-19 may have temporarily restricted illegal trade in wildlife. (Wildlife Justice Commission, 2020). Due to their relationship with COVID-19, wild animals such as bats and pangolins have become more popular. This study measured the awareness, perception and attitude of residents in southwest Nigeria on the impact of coronavirus on illegal wildlife trade.

Materials and Method

This study was carried out in southwestern Nigeria through the use of an online survey method for data collection. A pilot study was first conducted to assess the reliability of the instrument using purposive sampling (Oladeji *et al.,* 2019, Abidakun and Tunde-Ajayi, 2021) of wildlife conservation experts within a technological university in the southwestern region of the country. Reliability test (Cronbach's alpha) was done to determine the internal consistency of the questionnaire items for perception and conservation attitudes. The Cronbach's alpha was above 0.70 for both constructs which is an indication of reliability as stated by Nunally and Bernstein (1994). The pilot test was useful in modifying the questionnaire based on the findings. A self-administered questionnaire was developed based on a

comprehensive literature review and a focus group study involving a southwestern University's postgraduate conservationists in Nigeria. Data gathered was used to develop questions relating to this study. The questionnaire was designed to gather information such as socio-demographic characteristics of the respondents, perception and conservation attitude towards wildlife. The target population for this study was residents of south west Nigeria belonging to online conservation groups or society. Random sampling method was used to distribute questionnaire to respondents belonging to these groups (Arowosafe *et al*., 2021; Arowosafe *et al*., 2020). According to Preece (2000), an online society refers to people who are involved in an online group to achieve similar goals bounded by the norm and policies. The sample group was chosen from social media (WhatsApp). One hundred and fifty responses were recorded out of over two hundred online copies of questionnaire sent out. Online survey allowed for easy collation of responses.

Data Analysis

Data was collated and analyzed using Statistical Package for Social Sciences (SPSS 21) and results were presented descriptively using frequencies, percentages and tables (Tunde-Ajayi, 2021). Inferentially, chi square was used to test the relationship (Adetola and Tunde-Ajayi, 2020) between socio-demographic characteristics, perception and conservation attitude while ANOVA was used to check for differences in the respondents' willingness to support conservation among their socio-demographic characteristics.

Results

Table 1 shows the socio-demographic characteristics of the respondents. Highest percentage of the respondents were females (54.7%), though almost equal with males (45.3%). Highest percentage of the respondents were within youthful age of 21-30 years (80.7%) with tertiary level of education (99.3%). Furthermore, majority of the respondents were students (37.3%) and with income below ₦50,000 (61.3%).

Figure 1 indicates that majority of the respondents do not believe that COVID-19 was contracted from wildlife (70%) while 30% believe COVID-19 was contracted from wildlife while figure 2 shows that the majority of the respondents get information through internet/ social media (74.7%).

Table 1: Socio-demographic characteristics of the respondents

Variables	**Frequency (N=150)**	**Percentage (%)**
Gender		
Male	68	45.3
Female	82	54.7
Age		
Below 20 years	5	3.3
21-30 years	121	80.7
31-40 years	15	10.0
41-50 years	6	4.0
Above 50 years	3	2.0
Education		
Tertiary	149	99.3
Secondary	1	0.7
Occupation		
Unemployed	12	8.0
Student	56	37.3
Self employed	27	18.0
Private sector	32	21.3
Public/ civil servant	23	15.3
Income (₦)		
Below 50,000	92	61.3
51,000 - 100,000	23	15.3
101,000 - 150,000	11	7.3
Above 150,000	24	16.0

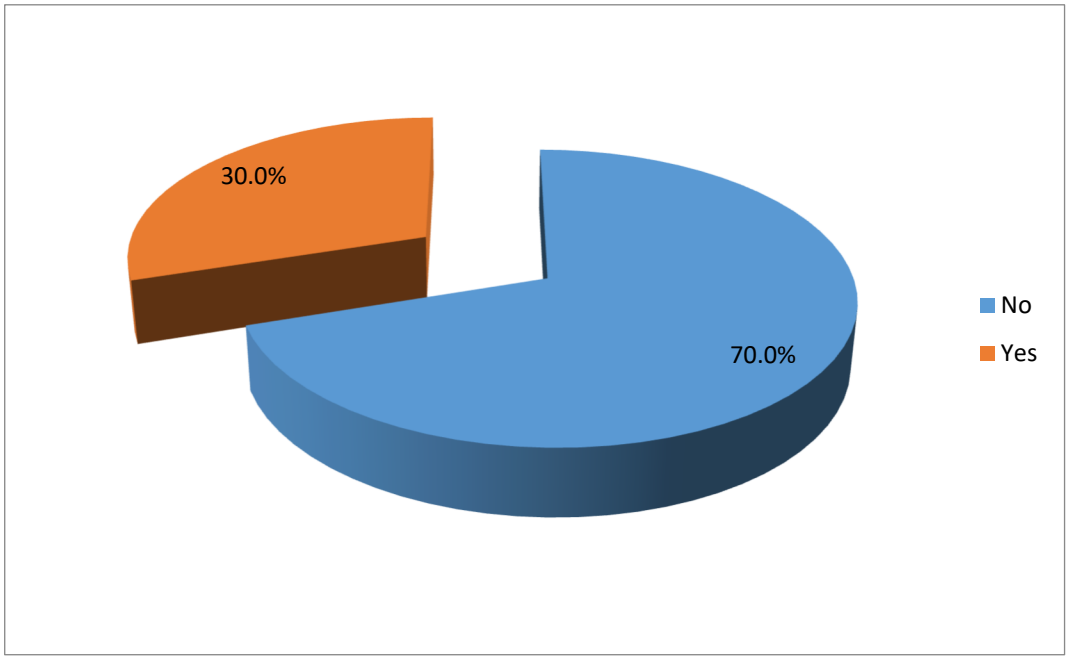

Fig. 1: Belief that COVID-19 was contracted from Wildlife

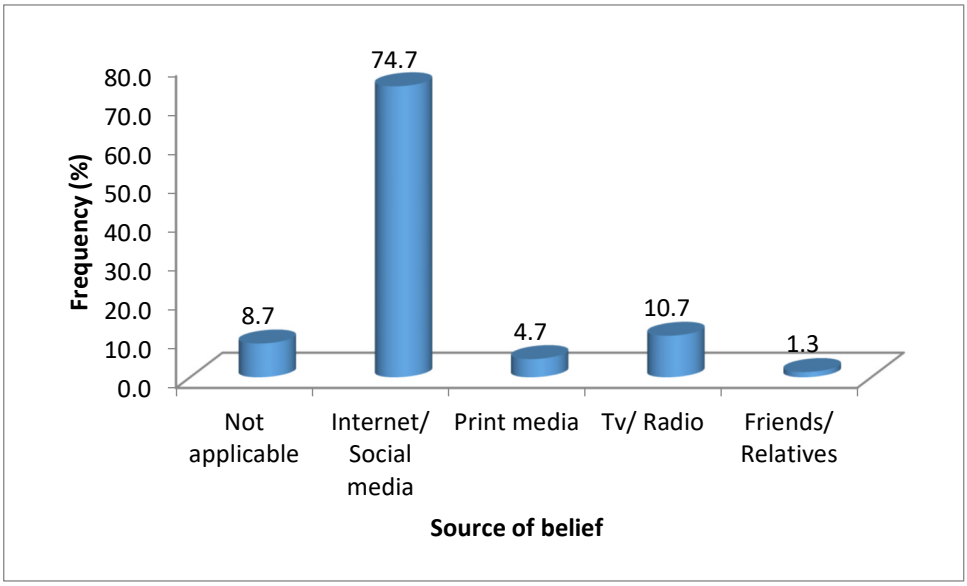

Fig. 2: Source of belief

According to table 2, the Cronbach alpha for perception is 0.704 while the Cronbach alpha for conservation attitude is 0.724. The scale in the instrument had acceptable internal consistency since the Cronbach Alpha values are above the cut-off value of (0.70) recommended by Nunnally and Bernstein (1994).

Table 2: Reliability of the instruments

Scale	No. of items	Cronbach Alpha coefficient
Perception	8	0.704
Conservation attitude	6	0.724

Table 3 reveals the perception of the respondents on wildlife despite the emergence of the pandemic. The mean value ranged from 2.37 to 4.01. “Ban on illegal wildlife trade due to Covid-19 will reduce the extinction of wildlife” had the highest mean value (4.01). The respondents also opined that the pandemic will increase research on wild animals thereby providing solutions to issues in wildlife and also that the pandemic has reduced human impact on wild animals' habitat. “Covid-19 was contracted from wild animals” had the lowest mean value (2.37).

Table 3: Perception of COVID-19 in relation to wildlife

Variables	Mean	Std. Dev
Covid-19 was contracted from wild animals.	2.37	1.144
Diseases are rampant due to human interaction with wild animals.	2.63	1.267
Human diseases will reduce if human beings stop illegal activities in wild animals' habitat.	3.38	1.344
This pandemic has reduced human impact on wild animals' habitat.	3.69	1.088
Ban on illegal wildlife trade due to Covid-19 will reduce the extinction of wildlife.	4.01	1.114
This pandemic will increase research on wild animals thereby providing solutions to issues in wildlife	3.75	1.037
This pandemic has increased awareness about wildlife.	3.27	1.060
Illegal hunting has reduced due to Covid-19	3.50	1.122

Table 4 shows the conservation attitude of respondents due to the pandemic; COVID-19. The mean value ranged from 2.40- 4.06. "I can watch wild animals in a zoological garden since I will not have contact with them" had the highest mean (4.06) while "I am no longer interested in eating bush meat because of Covid-19" had the lowest mean (2.40). This indicates that the respondents are still willing to consume by-product from wild animals "bush meat", though legally as they affirmed they would gladly report anyone involved in the illegal hunting of wild animals so as to stop disease outbreak.

Table 4: Conservation attitude of respondents due to COVID-19

Variables	Mean	Std Dev
I am no longer interested in eating bush meat because of Covid-19.	2.40	1.159
I will discourage the illegal hunting of wild animals by local hunters so as to stop the spread of Covid-19 and other zoonotic diseases	3.48	1.214
I can watch wild animals in a zoological garden since I will not have contact with them	4.06	0.914
I would not like to touch wild animals due to the risk of contracting diseases from them	3.15	1.255
I would gladly report anyone around me involved in the illegal hunting of wild animals so as to stop disease outbreak.	3.80	1.036
I will never buy bush meat because of the risk of contracting Covid-19	2.54	1.145

Figure 3 reveals the willingness of respondents to support wildlife conservation despite the outbreak of COVID-19. Contrary to expectation, almost all the respondents (96%) were willing to support conservation while just 4% of the respondents were not willing.

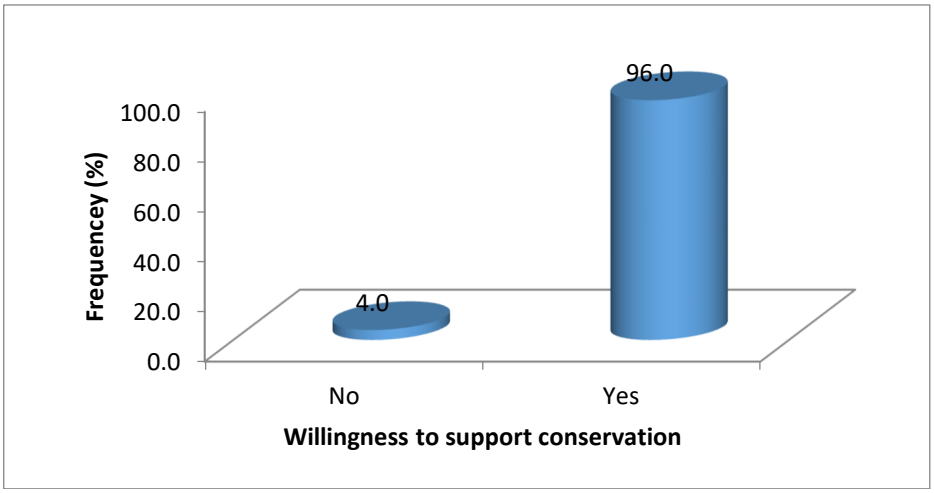

Fig. 3: Willingness to support conservation

Table 5 reveals the chi- square of relationship between demographic factors, perception of the respondents and their conservation attitude. Their belief that COVID-19 was contracted from wildlife (χ^2=33.939, P<0.05) and their perception (χ^2=554.162, P<0.05) had significant relationship with the respondents' conservation attitude which implies that their belief system coupled with the way they perceive wildlife during this pandemic has an effect on their conservation attitude towards wildlife.

Table 5: Relationship between demographic factors, perception and conservation attitude

Variable	**χ^2 value**	**Sig.**
Gender	28.730	0.093
Age	55.949	0.981
Education	5.857	0.999
Occupation	75.892	0.609
Income	55.521	0.640
Belief	33.939	0.027*
Perception	554.162	0.011*

* Significant at 0.05

Table 6 reveals the ANOVA test of difference of the respondents' willingness to support conservation among their demographic factors. There is a significant difference in the age of the respondents (F=4.797, P<0.01) regarding their willingness to support conservation despite COVID-19. This indicates that the rate at which the respondents are willing to support conservation differs among their different age groups, that is, one or more groups significantly support conservation more than other age groups. Other demographic factors not having significant difference indicates that they all show similar willingness to support conservation irrespective of their gender, education, occupation or income.

Table 6: Differences in willingness to support conservation among demographic factors

Variable	F	Sig.
Gender	0.035	0.851
Age	4.797	0.001**
Education	0.004	0.953
Occupation	1.590	0.180
Income	2.124	0.100

** Significant at 0.01

Discussion

Findings from this study revealed most of the respondents to be females. This is inconsistent with the estimated sex ratio of 1.04 male to 1 female in the year 2017 for Nigeria (CIA, 2018). Also, highest percentage of the respondents are in their youthful ages which is inclusive in the second largest national age group in Nigeria as a country (CIA Factbook, 2016) and with tertiary education implying that they are well-educated to answer questions in this research contradictory to findings by Arowosafe *et al.* (2017) who revealed primary education as highest education status. Majority are also low-income earners which could be as a result of the developing stage of the country and a result of most of them being students. Most of the respondents do not believe COVID-19 was contracted from wildlife even as their major source of obtaining information is through internet and social media. This could be because there is insufficient research on the pandemic due to its sudden emergence.

Contrary to popular negative opinions, COVID-19 outbreak has caused some positive impacts on wildlife conservation and researchers should therefore use this opportunity to strike a balance between outbreak of diseases and its impact on wildlife conservation as people can be patient to learn during these trying times why it is important to conserve wildlife and not interact illegally with them. Findings from this study reveals that the respondents perceived that ban on illegal wildlife trade due to COVID-19 will reduce the extinction of wildlife species. As stated by Can *et al.* (2019), the illegal trade in live animals poses a key threat to global health due to its unregulated nature. Also, concerns have begun to rise with the worldwide trade in wildlife due to its role in transmitting disease from one region to the other. Olival *et al*. (2017) supports this assertion by stating that wildlife-associated disease has a negative effect on animal health which could eventually lead to their death, destroy the diplomatic ties between nations and can make conservation efforts to protect biodiversity futile. The respondents also opined that the pandemic would increase research on wild animals thereby providing solutions to issues in wildlife as recommended by Jones *et al.* (2008) that research plans should focus on animals (and people handling the animals) coming from regions where research effort is not high, such as tropical Africa, Latin America and Asia. The respondents also claimed that the pandemic has reduced human impact on wild animals' habitat. This reduction of human impact in wildlife habitat will help reduce the risk of other wildlife-associated diseases that can be contracted in the wild as people are already not interested in going to the wild for fear of diseases as supported by Vaske *et al.* (2009) who stated the main reasons

of growing wildlife disease rates to include increasing human population, worldwide migration of humans and wild animals, urbanization and agriculture by humans thereby encroaching on wildlife habitat. They also claimed illegal hunting has reduced due to this disease outbreak as supported by Decker *et al.* (2012) who stated that a group of people gave stopping hunting white-tailed deer because they perceived it to be transmitting chronic wasting disease.

Regarding the respondents' conservation attitude developed due to this COVID-19 emergence, they agreed they can still watch wild animals in a zoological garden since they would not have contact with them and this is the essence of zoological gardens which is in line with studies by Adetola and Tunde-Ajayi (2015). This assertion will increase support for conservation while reducing the rate at which humans touch or have impact on wild animals as supported by Karesh *et al.* (2005) that instead of trying to eradicate wild animals that harbour diseases, efforts in reducing wild animals-human contact could prove to be the most practicable and cost-effective way in decreasing the human health threat caused by wildlife-associated diseases worldwide. The respondents also claimed they would gladly discourage and report anyone involved in illegal hunting of wild animals to stop disease outbreak as the respondents are aware illegal handling of these animals could spread diseases although they would still love to consume meat from wildlife legally. This shows they would support legal means of acquiring wildlife since legal means can control disease insurgence as proper monitoring by appropriate authorities is available. Their clear intentions of public support in discouraging illegal hunting or trade of wildlife shows a positive conservation attitude which would help conservation efforts as the recent pandemic has further enlightened them on the dangers of wildlife-associated diseases and is in line with Reino *et al.* (2017) government institutions' ban on wildlife trade can stimulate illegal trade activity and can oppose values of human equity, unless there is a behavioural change in the people involved and dependent on both purchase and sales of these wildlife which could be achieved through initiatives directed at the people to achieve this purpose (Can *et al*., 2019). Despite the emergence of COVID-19 pandemic and the negative perceptions surrounding wildlife due to this pandemic, the respondents affirmed they are willing to support wildlife conservation as opposed by Decker *et al.* (2010) concerns about negative effects of wildlife-associated disease could cause decrease in support for wildlife. As such, research should be focused on issues relating to wildlife and how these problems can be solved to continue to develop positive perception about wildlife.

Conclusion

This study revealed that majority of the respondents do not believe Covid-19 was contracted from wildlife and are also of the perception that ban on illegal wildlife trade due to COVID-19 will reduce the extinction of wildlife species. Also, most of the respondents have a positive attitude towards wildlife conservation as they showed intentions of discouraging illegal hunting or trade in wildlife and to report anyone involved in this act. Strict laws to reduce illegal wildlife trade and wild animals-human contact should be

enforced as this will reduce the transmission of zoonotic diseases.

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