Original Research Article

Perceived effect of COVID-19 on the Health of Charcoal producers in the Guinea Savannah Agro-ecological Zone of Nigeria

Abstract

Charcoal production is a very cheap business embarked upon by rural dwellers because little or nothing is paid for cutting trees, kiln preparation and monitoring. Charcoal producers ignored the health implications of the activity especially during the COVID-19 pandemic resulting in several health disorders. Thus, the study examined perceived effect of COVID-19 on the health of charcoal producers in the derived savannah agro-ecological zone of Nigeria. Data were collected through the use of structured interview scheduled. A total of 178 respondents were selected using multistage sampling technique. Data were analysed through the use of frequency, mean, standard deviation and inferential statistics: chi-square and Analysis of Variance (ANOVA). The study reveals that 78.1% and 75.3% of the respondents strongly agreed respectively that they usually used local herbs to treat all ailments during Covid-19 and local herbs could treat Covid-19. About 69.7% of the respondents said that charcoal producers always experienced difficult

Comment [NN1]: Nothing is said about ethical clearance before data collection

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breathing during Covid-19, 69.7% strongly agreed that high death were recorded than before covid-19 pandemic, while 88.2% of the respondents had low level of the effect of Covid-19 on their health. In addition, 60.1%, 55.1% and 57.3% of the respondents strongly agreed that Covid-19 does not exist at all, that it is a taboo, while shaking hands with customers/friends is a symbol of love and that they cannot do without touching both face and nose during Covid-19 pandemic respectively. However, 93.3% of the respondents did not comply with the Covid-19 preventive measures while reveals that 73.6% of the respondents experienced negative effect of Covid-19 on the marketing of charcoal in the study. The study concludes that charcoal producers did not believe in the existence of Covid-19 and this may be dangerous to their health. Hence, education awareness on the hazard of Covid-19 to the health of charcoal producers should be encouraged.

Keyword: Charcoal Production, Covid-19 Pandemic, Health of charcoal producers, Compliance, Environment

Introduction

When considering the livelihood opportunities that are within the reach of those living below a dollar per day, charcoal production cannot be underscored. This is because it is a quick way of making money to settle feedings, hospital, education bills and other social engagements. Charcoal production is also very cheap to embark upon because little or nothing is paid for cutting trees, kiln preparation and monitoring. It is also a cheap source of energy for both cooking and heating among many rural and urban households in Nigeria. Charcoal production also makes use of men, women and children in its preparation and marketing.

It is worth to note that charcoal production in the World has increased tremendously from about 37 million tons in 2000 to 51.2 million tons in 2017. Of this quantity, Nigeria, Egypt, and Ethiopia produced the highest quantity (Catherine & Reto, 2019). From the quantity produced in Nigeria, about 70% were exported to Europe. Suffice to note that the latter rely so much on Nigeria for the supply of charcoal.

Several factors determine the quantity of charcoal produced such as availability of trees, quality of trees, role of law enforcement agencies, season, labour availability, and health of the producers among others (Bada *et al*., 2009). Considering these factors, the one that is playing a significant implication in recent time is health of the charcoal producers.

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Records show that several pandemics have ravaged the world in the past. For instance, smallpox, tuberculosis, and especially Black Death which was referred to as the most fatal pandemic with estimate of 75–200 million death in the 14th century. Recent century pandemic experienced was 1918 influenza pandemic (Spanish flu) and HIV/AIDS (Kon *et al.*, 2012). While the most recent one ravaging the World is COVID-19 or otherwise called Corona Virus which began like a mirage in China and now spread to most of the continent and left about 586,431 deaths recorded as at 25th of June 2021 (Gavi The Vaccine Alliance, 2021). Most of the Africa countries are still in panic because WHO approved vaccines has not gone around the world.

The disease has led to a lot of economic loss because of the total lockdown introduced by most of the World leaders including Nigeria. Since March 27, 2020 when the first index case was recorded in Nigeria through an Italian business man, and thereafter, several Europe returnees brought it into the country and this led to community spreading with more than four thousand within three months because of its fast mode of transmission (Bisht *et al.*, 2020). As at June, 2021, about 167,401 cases and 2,118 deaths were confirmed in Nigeria (Nigeria Coronavirus cases, 2021). The unfortunate part of the disease is that it does not discriminate between the upper and the lower echelon of the society.

This affected both the public and private sectors of the economy. The pandemic that ravaged the country early in the year 2020 also have economic implications especially when budget implementation had not been commenced.

Immediately the community spread of the disease began, the Federal Government declared a total lockdown in states that were mostly affected; Lagos, Ogun and Federal Capital Territory. As the index cases increases in each state, most of the state governments designed the lockdown through imposition of curfew. These lockdown and curfew initiated by the government affected virtually all sector of the economy including goods and services. People could not move freely from one place to the other for their daily business. This pandemic did not leave charcoal producers unaffected.

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Already, charcoal production with its own health attendants such as respiratory disease: cough, sneezing, difficult breathing, chest pain, among others (Eniola, & Odebode, 2018) have some similar symptoms with Covid-19 (Esposito *et al*., 2016).

Despite the awareness made by the Nigeria Centre for Disease Control (NCDC) such as regular washing of hands with soap, rinsing of hands with sanitizer, social distancing, use of face mask, and report of those with Covid-19 symptoms (Worldometer, 2021), it is worth to note that most rural dwellers including charcoal producers still produces charcoal

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especially in Oyo and Kwara states and strive to sell their products to the end users. This act may aggravate the pandemic and cause more socio-economic problems.

Hence this study will determine the effect of covid-19 among charcoal producers in Nigeria.

The specific objectives include

1. To determine the socio-economic characteristics of charcoal producers in the study area
2. To assess the effect of covid-19 on the health charcoal producers
3. To describe the effect of covid-19 on the market of charcoal
4. The assess the level of compliance of charcoal producers to Covid-19 preventive measures

2. Methodology

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2.1 Study Area

The study area is the guinea savannah zone of Nigeria. This zone is the largest part of the savannah zone and is sometimes divided into the southern guinea savannah which consists of the following States; Benue, FCT, Plateau, parts of kwara State and Niger States and northern guinea savannah (which consists of Kaduna State). It is the broadest vegetation

zone in the country and it occupies almost half of its area. It is located at the centre of the country, extends southwards to southern Nigeria and pushes northward beyond Zaria. It covers an area that has 100 – 150 cm of annual rainfall and where the wet season lasts for 6 - 8 months. It has trees species such as the false balsam copaiba *(Daniellia oliveri),* used for carving mortars and pestles for pounding yam, *Terminalia, Lophira, Afzeila, Daniellia and Vitex, Khaya senegalensis* (the poor mahogany) are the species found in the guinea savannah. The northern guinea savannah consists of species such as *Isoberlinia doka and I. tomentosa* which formed the bulk of the scattered woodland. Other tree species are locust bean tree *(Parkia filicoidea),* shea butter tree *(Butyrospermum parkii)* and mangoes *(Mangifera indica)*.

Comparatively, there are fewer trees in the northern guinea savannah than in the southern guinea savannah. During the rainy season, the whole zone is green and covered with tall grasses that grow and reach maturity rapidly and thus become fibrous and tough. In the dry season they tend to die and disappear and one can see for kilometres. This clearing is due to several periodical bush-burning that occurs during the dry season

between November and April, carried out to either assist in farm clearance or hunting. The long period of dry season in this zone favours large scale production of charcoal. The common trees are Acacias, Baobab, and Shea-butter (Eniola *et al*., 2012)

2.2 Experimental Design

Multi-stage sampling procedure was used to select respondents from the population of charcoal producers in guinea savannah zone. 42 major charcoal producing communities were identified through snowball. Nine charcoal producing communities were randomly selected. These are Doka, Ubaya, Bida, Borgu, Edati, Katcha, Awajir, Layun, and Obi communities. Fifty percent (50) of the population of charcoal producers in each community were selected using simple random sampling technique. A total of one hundred and seventy-eight charcoal producers were used as respondents for this study. A Likert-type five point rating scale of "strongly agree" to "strongly disagree" (with scores 5-1 for positively worded statements and 1-5 for negatively worded statements respectively), respondents were requested to indicate their opinion on

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Experimental designs are mostly used in Randomized Controlled Trials. Samples will be under experiment and the other sample will be control.
To me the study is a mere quantitative study

Sample size must be justified. What formula was used? Was a statistician consulted to get to the sample size? What was the sample inclusion and Exclusion criteria?
How were the respondents recruited?

Ethical consideration
This paper does not report on the ethics. No ethical Clearance; No Permission to use the human respondents from the Department of Health-Nigeria;
No mention of an informed Consent that was signed;
How was harm prevented from the respondents, How were the principles of anonymity, confidentiality, privacy, and justice ensured in this study?
Data collection: Instrument: Who designed the instrument? How was the validity and reliability – ensured?
Who collected data and how?
Data analysis
How was data managed? And for how long?

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each of the selected statements about perceived effect of covid-19 among charcoal producers in Nigeria.

Results and discussion

1. Socio-economic Characteristics of Respondents

Table 1 indicates that mean age of respondents was 37±5.2 years. This shows that they are in their productive ages. About, 48.3% of the respondents fell between 35 and 44years of age, 36.0% of the respondents fell between 25yers and 34years of age while 9.5% of the respondents fell between more than 54years in the area. About, 35.3% of the respondents had no formal education, 28.7%attended Koranic School, 20.6% had primary school leaving certificate, 11.2% had secondary schools while the remaining 3.9% of the respondents had tertiary certificate. The reveals that few of the respondents had little or non-formal education in the study area. Majority (87.6%) of respondents were males while about, 12.4% of the respondents were female. This result is in consonance with the study of (SEI, 2002), which reported that charcoal production appears to be dominated by young men. Majority (79.8%) of respondents were married. In this area, 54.5% had crop farming, 19.7% had charcoal production as primary occupation, 12.3% worked as hired hand. Majority, 76.4% of the respondents had

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charcoal production as secondary occupation and 22.5% of the respondents had crop farming as secondary occupation while, 1.2% had hunting as secondary occupation. Shackleton *et al*., (2006) in a related study, reported that farmers are likely to involve in charcoal production because they clear lands which provide easy access to wood for charcoal production. However, 44.4% of the respondents had more than 15 years of experience. About, 43.39% earned between N300,001 and N400,000per annum.

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Table 1: Distribution of Respondents on their Socio-economic Characteristics N=178

Socio-economic characteristics	Freq	%	
Age (Years)			
25-34	64	36.0	Age= 37, SD=5.2
35-44	86	48.3	
45-54	11	6.2	
More than 54	17	9.5	
Education Attainment			
Non Formal Education	63	35.3	
Koranic School	51	28.7	
Primary School	37	20.6	
Secondary School	20	11.2	
Tertiary Institution	7	3.9	

Sex			
Male	156	87.6	
Female	22	12.4	
Marital Status			
Single	20	11.2	
Married	142	79.8	
Widowed	6	3.3	
Divorced	10	5.6	
Primary Occupation			
Crop Farming	97	54.5	
Livestock	0	0.0	
Fishing	17	9.6	
Charcoal Production	35	19.7	
Hunting	7	3.9	
Working as hired hand	22	12.3	
Secondary Occupation			
Crop Farming	40	22.5	
Livestock	-	-	
Fishing	-	-	
Charcoal Production	136	76.4	
Hunting	2	1.2	
Working as hired hand	-	-	
Year of experience			
< 5years	21	11.8	M=15, SD=5.1
6-10years	12	6.7	
11-15years	66	37.1	
> 15years	79	44.4	
Household size			

< 5	40	22.5
6-10	57	32.0
11-15	81	45.5
Annual Income		
Less than #100,000	32	18.0
#100,001-#200,000	20	11.2
#200,001-#300,000	49	27.5
#300,001-#400,000	77	43.3

2.0 Perceived effect of Covid-19 on the health of Charcoal Producers

Table 2 reveals that 78.1% and 75.3% of the respondents strongly agreed respectively that they usually used local herbs to treat all ailments during Covid-19 and local herbs could treat Covid-19. About 69.7% of the respondents said that charcoal producers always experienced difficult breathing during Covid-19, 69.7% strongly agreed that high death were recorded than before covid-19 pandemic. This may be confused with the symptoms and death of Covid-19. In addition, 67.4% of the respondents strongly agreed they were not ready to subject themselves to Covid-19 test in the area. About 77.5%, 50.6% and 58.4%

of the respondents strongly agreed that sneezing and repeated dry cough during charcoal production could be misconstrued to symptoms of covid-19 and that Covid-19 was another type of Malaria respectively.

The table further reveals that 78.7% of the respondents strongly disagreed that no life was lost in their community during Covid-19. While 53.9% of the respondents strongly agreed that people that died in their community could be as a result of Covid-19. The finding of this study was corroborated by Mayo Foundation for Medical Education and Research (MFMER). (2020) who concludes that joint/chest pain, cough, fatique, shortness of breath, muscle pain, loss of smell and others are among the symptoms of Covid-19. This implies that lives were lost in their community during Covid-19 and some could be as result of Covid-19.

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Comment [NN20]: should come under Table 2

Table 2: Distribution of Respondents according to the perceived effect of Covid-19 on the health of Charcoal Producers

Effect of Covid-19 on the health of Charcoal Producers	SA	A	U	D	SD

Comment [NN21]: Does this mean "unsure" It has not been explained in the tool above.

		Freq %	Freq %	Freq %	Freq %	Freq %
1	Most of my community members were infected by Covid-19	5 2.8	15 8.4	50 28.1	102 57.3	6 3.4
2	People that died in our community could be as a result of Covid-19	96 53.9	42 23.6	39 21.9	0 0.0	01 0.6
3	Sneezing during charcoal production can be misconstrued to Covid-19	138 77.5	25 14.0	14 7.9	01 0.6	0 0.0
4	Repeated dry cough during this period is not a symptom of Covid-19	90 50.6	40 22.5	36 20.2	0 0.0	11 6.2
5	We are already used to body pain, weakness/ high fever during charcoal production hence cannot be a symptom of Covid-19	104 58.4	17 9.5	13 7.3	36 20.2	8 4.5
6	Charcoal producers always experienced difficult breathing during Covid-19	124 69.7	9 5.1	39 21.9	7 3.9	3 1.7
7	I found it difficult to get health attendants to confirm my health status during Covid-19 pandemic	34 19.1	96 53.9	20 11.2	17 9.6	11 6.2
8	We usually used	139	30	0	6	3

	local herbs to treat all ailments during Covid-19	78.1	16.9	0.0	3.4	1.7
9	No life was lost in my community during Covid-19	0 0.0	0 0.0	8 4.5	30 16.9	140 78.7
10	Local herbs can treat Covid-19	134 75.3	25 14.0	10 5.6	8 4.5	1 0.6
11	Because of our high immunity, none of us was infected with Covid-19	80 44.9	9 0.1	12 6.7	17 9.6	60 33.7
12	We recorded high death than before Covid-19 pandemic	124 69.7	16 9.0	19 10.9	10 5.6	9 5.1
13	Deforestation could not be attributed as part of cause to Covid-19	108 60.7	29 16.3	17 9.6	4 2.3	20 11.23
14	We are not ready to subject ourselves to Covid-19 test	120 67.4	47 26.4	0 0.0	11 6.2	10 5.6
15	1 sometimes experienced shivering/shaking (chills) during this period	44 24.7	67 37.6	14 7.9	3 1.7	50 28.1
16	Loss of taste/smell is part of my recent experience	23 12.9	14 7.9	26 14.6	66 37.1	49 27.5
17	Covid-19 is another type of Malaria	104 58.4	24 13.5	18 10.1	10 5.6	22 12.4
18	Diarrhea/abdominal pain are common ailments and so	98 55.1	23 12.9	26 14.6	22 12.4	8 4.5

	cannot be symptoms of Covid-19					
19	Headache, joint/chest pain are normal ailments of charcoal producers and so it may not necessarily be as a result of Covid-19	128 71.9	12 6.7	0 0.0	23 12.9	15 8.4

3. Level of Perceived effect of Covid-19 on the health of Charcoal Producers

Table 3 reveals that 88.2% of the respondents had low level of the effect of Covid-19 on their health. This implies that charcoal producers do not believe in the existence of Covid-19 pandemic. This might be as a result of their low level of education.

Comment [NN22]: This description should come below Table 3

Table 3. Level of Perceived effect of Covid-19 on the health of Charcoal Producers

Perception on health-related problem	**Scores**	**Freq. N=178**	**%**
Low perception	19-82.3	157	88.2

High perception	82.4-95	11	11.8
Mean score	80.5		
Std. Dev.	8.9		

4.Compliance with Covid-19 preventive measures

Table 4 reveals that 60.1%, 55.1% and 57.3% of the respondents strongly agreed that Covid-19 did not exist at all, that it is a taboo, while shaking hands with customers/friends is a symbol of love and that they could not do without touching both face and nose during Covid-19 pandemic respectively. More so, about 69.7%, 43.8%, 43.8% and 43.8% strongly disagreed that social distancing were parts of the preventive measures, used of sanitizers to rub our hands were essential, that they always used face mask during Covid-19 pandemic and that it was not necessary to wash their clothes regularly to prevent Covid-19 infection respectively.

However, 49.4% of the respondents agreed that using ashes to wash hands could do the same thing with soap during Covid-19 pandemic.

This implies that most of the respondents do not believe that Covid-19 exist at all.

Comment [NN23]: Same comment. Description must come below Table 4

Table 4: Distribution of Respondents on Compliance with Covid-19 preventive measures

S/N	Compliance with Covid-19 preventive measures	SA		A		U		D		SD	
		%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.
1	My family always use face mask during Covid-19 pandemic	22	12.4	29	16.3	0	0	49	27.5	78	43.8
2	We always use sanitizers to rub our hands during Covid-19 pandemic	23	12.9	48	27.0	0	0	52	29.2	55	30.9
3	Washing of hands was not	34	19.1	19	10.7	0	0	49	27.5	78	43.8

	essential during Covid-19										
4	Social distancing are parts of the preventive measures during Covid-19	5	2.8	34	19.1	0	0	15	8.4	124	69.7
5	I cannot do without touching both face and nose during Covid-19	102	57.3	42	23.6	0	0	20	11.2	14	7.9
6	Shaking hands with customers/friends is a symbol of love during Covid-19 which we	98	55.1	37	20.8	0	0	10	5.6	33	18.5

	cannot avoid										
7	It is not necessary to wash our clothes regularly to prevent Covid-19 infection	6	3.4	30	16.9	0	0	6436.0		78	43.8
8	Covid-19 does not exist at all. It is a taboo	107	60.1	34	19.1	15	8.4	179.6		5	2.8
9	Using ashes to wash hands can do the same thing with soap during Covid-19	64	36.0	88	49.4	22	12.4	0		4	2.2

5. **Level of Compliance with Covid-19 Preventive measures**

Table 5 reveals that 93.3% of the respondents did not comply with the Covid-19 preventive measures. Since they believed that Covid-

19 did not have any health implications during charcoal production, definitely they will not comply to its preventive measures.

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Table 5. Level of Compliance with Covid-19 Preventive measures

Compliance with Covid-19 preventive measures	Scores	Freq. N=178	%
Low compliance	9-41.6	166	93.3
High compliance	41.7-45	12	6.7
Mean score	40.2		
Std. Dev.	2.9		

6. Effect of Covid-19 on the market of charcoal

Table 6 reveals that 84.3% and 67.4% of the respondents strongly agreed that they could not load charcoal with truck during the lockdown period

of Covid-19 and charcoal could not be transported to a long distance respectively. About, 11.2% of the respondents strongly agreed that they sold charcoal at low price during Covid-19. This implies that during the pick period of Covid-19 transportation was restricted; charcoal could not be transported to far distances.

However, 73.0% and 55.1% of respondents strongly disagreed that they made good sales of charcoal than before Covid-19 emergence and sold at low price during Covid-19 pick period in the area. Since there was restriction for movement of vehicles to transport gas, the alternative cheapest source of energy for the household and in large quantity was charcoal for both cooking and heating among many rural and urban households in Nigeria.

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Comment [NN27]: Same comment

Table 6. Distribution of the respondents according to the effect of Covid-19 on marketing of charcoal

s/n	Effect of Covid-19 on the marketing of charcoal	SA	A	U	D	SD
		Freq %	Freq %	Freq %	Freq %	Freq %
1	Local market is always available for charcoal during Covid-19 pandemic	120 67.4	47 26.4	0	11 6.2	10 5.6
2	We sell at low price during Covid-19 pandemic	20 11.2	14 7.9	0	44 24.7	98 55.1

3	Charcoal cannot be transported to a long distance during Covid-19 pandemic	120 67.4	48 27.0	0	7 3.9	3	1.7
4	I made good sales of charcoal than before Covid-19 pandemic emergence	19 10.7	3 1.7	0	26 14.6	130 73.0	
5	We cannot load charcoal with truck during Covid-19 pandemic	150 84.3	19 10.7	0	6 3.4	3	1.7

7. Level of effect of Covid-19 on marketing of charcoal

Table 7 reveals that 73.6% of the respondents had negative effect of Covid-19 on the marketing of charcoal in the study. This is so because of the compulsory lock-down initiated by the government which prevented interstate movement of vehicles.

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Effect of Covid-19 on charcoal marketing	**Scores**	**Freq. N=178**	**%**
Low effect	5-8.7	47	26.4
High effect	9.2-25	131	73.6
Mean score	9.1		

Std. Dev.	0.7

8. Relationship between Level of Compliance with Covid-19 Preventive measures and perceived effect of covid-19 on the health of charcoal producers

Table 8 reveals that there is significant relationship between the level of compliance with Covid-19 preventive measures and perceived effect of covid-19 on the health of charcoal producers in the study area (r=0.031). This implies that the more charcoal producers comply with Covid-19 preventive measures the more they will have high perception of the effect of covid-19.

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Table 8. Relationship between Level of Compliance with Covid-19 Preventive measures and perceived effect of covid-19 on the health of charcoal producers

Agro-ecological zone	N	r-value	p value	Decision
Guinea savannah	178	0.031	0.021	S

Conclusion

The study shows that males were predominant in charcoal production and they took the activity as secondary occupation. Charcoal producers did not comply with the Covid-19 preventive measures. They had low level perception to Covid-19 pandemic. More deaths were recorded during Covid-19. It was recommended that more awareness is needed to be made among the charcoal producers especially because of the similarity in some of the symptoms of Covid-19 and what they usually experience during charcoal production. Charcoal producers needs to be encouraged to go for regular check-up in government hospitals so as to ascertain their health status. Also, government needs to be stricter in their action so as to ensure compliance to the Covid-19 preventive measures.

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