Impact of Covid-19 Pandemic on Household Food Security in Selected Households in Odeda local Government Area of Ogun State

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ABSTRACT

Food security in Nigeria especially at the household level over the past years has been negatively and unstable. The occurrence of COVID-19 globally has however contributed to the decline in food availability and affordability as many individuals experienced economic collapse. This study investigated the impact of the COVID–19 pandemic on household food security in 203 households in Odeda Local Government Area of Ogun State. This cross-sectional study used an interviewer-administered questionnaire using validated socio-economic and socio-demographic questionnaires, Food insecurity experience scale (FIES) and coping strategy index (CSI) questionnaires. Data collection was carried out post-COVID and respondents were asked the question (FIES and CSI) retrospectively. Data was analysed with descriptive and inferential statistics using Statistical Product and Service Solutions (SPSS VERSION 20.0). The findings revealed the prevalence of food insecurity in the selected households in the study area as 76.7% the prevalence of food insecurity due to the COVID-19 pandemic lockdown in households was 67.5%. More than three quarter (78%) of the respondents were involved in low coping strategies. There was a strong positive relationship between the FIES score of the respondents and the coping strategy index at P-value =0.01. In this study, respondents experienced a lack of access to food and income which made them employ coping strategies in other to manage lack or shortage of food. The pandemic also caused an aggravated increase in the level of food insecurity of respondents who were food insecure even before the lockdown.

Keywords: : COVID-19, Economic collapse, Lockdown, Food security, Coping strategy index

INTRODUCTION

The COVID-19 pandemic has led to a drastic loss of human life worldwide and it presents an unprecedented challenge to public health and food systems *(International Labor Organization et al. 2020)*. COVID-19 has also severely affected the global economy and financial markets which together pose a serious threat to food security, particularly in poorer countries *(Pak et al, 2020; Swinnen and McDermott, 2020)*. Across the globe, governments continue to enact measures to suppress the progression of the COVID-19 pandemic; these measures consist largely of movement restrictions and social distancing that help limit the spread of the virus, though they also limit access to income-earning opportunities for many populations and slow trade activities *(Famine Early Warning Systems Network, 2020)*.

The COVID-19 pandemic, according to the *World Health Organization, International Labor Organization, Food Agriculture Organization, and International Fund for Agricultural Development (2020)*, has been affecting the entire food system and exposing its fragility. Farmers have been prevented from accessing markets by border closures, trade restrictions, and confinement measures, and agricultural workers have been prevented from harvesting crops. This has caused disruptions to both domestic and international food supply chains and reduced access to a variety of safe, healthy diets.

Food is one of the most important items in the world as it is critical to human survival together with clothing and Shelter, these three items are usually classified as the man's basic needs *(Fawole et al.,2015)*. Currently, food insecurity is a major challenge worldwide with 17% of people in developing countries living in extreme poverty *(World Bank, 2015)*. According to *Pérez_escamilla (2017)*, nearly 800 million individuals do not have enough food, more than 2 billion individuals experience key micronutrient deficiencies and 60% of individuals in low-income countries are food insecure.

Food security affects more than human health and welfare, it also contributes to economic and political stability. Most countries of the world where there is political instability are associated with food-insecure territories, the food insecurity in such countries might have been a result of political instability *(Fawole et al., 2015)*. According to a report by *Okafor et al., (2020)*, Food insecurity in Nigeria is continuously being aggravated by myriad factors, including communal conflicts and, most recently, the COVID-19 pandemic. The presence of militant groups like Boko Haram, in addition to violent clashes between herders and farmers, has further compounded the problem. It was further stated that the country's food insecurity and resulting malnutrition can also be attributed to poor funding for sustainable policies, limited mechanized farming, poor rural development, and prohibitive practices that disenfranchise women farmers.

Before the COVID-19 pandemic, there was already an existing gap in the Nigerian food system, which led to the importation of food items to augment local production to meet local demand; the pandemic has further disrupted each segment of the food supply chain, but the effects are different along the rural-urban continuum. More urbanized areas may be harder hit than remote rural areas if connectivity remains broken down, as most food is produced in rural and semi-rural areas *(Savastano, 2020)*. *World Bank (2020)* in a review reported that COVID-19 is estimated to have dramatically increased the number of people facing acute food insecurity in 2020-2021. As of April 2021, the World Food Programme (WFP) estimates that 296 million people in the 35

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countries where it works are without sufficient food and 111 million more people than in April 2020.

Lockdowns and other containment measures have driven up unemployment, disrupted food supply chains, and cut off the flow of remittances around the globe. Hundreds of millions have lost their jobs because of the pandemic, making food particularly nutritious and unaffordable for many even where it is available *(Cheatham et al.,2020)*. This study therefore aims to measure the impact of the COVID-19 pandemic on food security and the coping strategies adopted in Odeda Local Government Area of Ogun State.

MATERIALS AND METHODS

The materials and methods section should provide sufficient details about the applied methods and techniques to allow replication of all parts of the study. Standard techniques and approaches do not need to be described in detail; use references to previously published methods and techniques instead.

RESULTS AND DISCUSSION

METHODOLOGY

Study Design

A descriptive cross-sectional design was used to carry out this study among women of reproductive age in selected households in the Odeda local government area of Ogun state.

Study Area

Odeda is a Local Government area in Ogun State. It has an area of 1,560 km2 and a population of 109,449 at the 2006 census. The people are predominantly Egbas and they speak the Egba dialect. However, their main language is Yoruba while a few non-Yoruba are Fulani, Hausa, Igedes of Benue State and Ito.

Sampling Technique and Procedure

A multistage sampling method was used for this study.

Stage 1: Simple random sampling method was used to select four (4) Obantoko, Odeda, Osiele

and Alabata from the ten (10) wards which include Alabata, Alagbagba, BalogunItesi, Ilugun, Obantoko, Obete, Odeda, Olodo, Opeji and Osiele in Odeda Local Area of Ogun State.

Stage 2: Systematic random sampling was adopted in selecting every 2nd household in each of the selected wards.

Stage 3: Simple random sampling was used to select every second household to get 203 respondents.

Study Respondents

The study respondents comprised women of reproductive age (15-49 years) in selected households in the Odeda local government area of Ogun state.

Sample Size Determination

The Sample size was determined using Fischer's sample size formula as shown below:

Minimum sample size (n) = $\underline{Z^2 \times p \times q}$ *(Sin-Ho, 2014)*

                      d^2

Where n = desired minimum sample size

Z = table value for standard normal deviation corresponding to 95% significance level (1.96).

P = Prevalence of beverage consumption which is 0.87 *(Ibukun and Adebayo, 2021)*

D = Margin error, (5%) set at +0.05

Therefore,   n= $\underline{(1.96)^2 \times 0.87 \times (1\text{-}0.87)}$

                         $(0.05)^2$

        = $\underline{3.8416 \times 0.87 \times 0.13}$

             0.0025

                             = 173.79

The sample size (N) for the study was rounded up to two hundred and three (203) respondents to cater for attrition.

Method of Data Collection
Data on socio-demographic and socio-economic were obtained using a semi-structured pre-tested interviewer-administered questionnaire. Body Mass Index (BMI was calculated using respondents' weight and height measured. BMI = kg/m2, where kg is weight in kilograms and m2 height in metres squared. A BMI of 25.0 or more is overweight, while the healthy range is 18.5 to 24.9. BMI applies to most adults 18-65 years old *(Diabetes Canada, 2020).* Waist and hip circumference were also collected to determine the waist-to-hip ratio of the respondents *(Watsons, 2018; Scott, 2020).* The impact of the COVID-19 pandemic on household food Security and the coping strategies adopted were measured using two (2) standard tools: The food security Experience Scale Tool (COVID-19 Modified) *(Food Agriculture Organization, 2020)* and the Coping Strategy Index Tool *(Maxwell and Caldwell, 2008).*

Food Insecurity Experience Scale
The set of eight (8) questions composes a scale that covers a range of severity of food insecurity with a yes/no response. FIES-SM is composed of a statistical scale designed to cover a range of food severity and will be analysed together as a scale, not as separate items *(FAO, 2020).*

The questionnaire was adapted from an improved version that adds follow-up questions to capture the extent to which food insecurity experiences are linked by the respondents specifically to the COVID-19 crisis *(FAO, 2020).*

The FIES occurrence and frequency question was separated from the COVID-19-specific questions for descriptive analysis; this was done to measure the percentages of the respondents who were food insecure as a result of the pandemic. Respondents who were food-secured were however not included in the analysis of the COVID-19-specific questions.

The responses were graded as Yes=1, No=0; the eight occurrence questions are totalled 8score, which means that the highest score a respondent can have in the 8 occurrence questions is eight (8).

The frequency of occurrence questions which included three (3) questions from number six (6) to eight (8) were graded as follows: 1-2 (rarely) = 1; 3-10 (sometimes) = 2; 10 or more (often) = 3

The scores sum to a total of nine (9) scores, making a total of seventeen (17) scores. Scores obtained by respondents were categorized into four (4); Food secure (0-1), Mild food insecurity (2 - 6.6), Moderate food insecurity (6.7 –11.5), and Severe food insecurity (11.6 – 17).

FIES COVID-19 specific questions which are eight (8) were graded as Yes= 1, No = 0. The highest score obtainable by a respondent is eight (8); scores obtained were categorized as follows: 0-2.6= Mild food insecurity; 2.7 – 5.3= Moderate food insecurity; 5.4 – 8 = Severe food insecurity.

Coping Strategy Index

A series of questions about how households manage to cope with a shortfall in food for consumption results in a simple numeric score. The CSI is based on the many possible answers to one single question: "What do you do when you don't have adequate food, and don't have the money to buy food?"

It was developed in Uganda and Ghana but has been for early warning and food security assessment in several other African countries, including Kenya, Ethiopia, Eritrea, Zimbabwe, Zambia, Malawi and Burundi; as the main instrument for data collection. The responses obtained from the twelve (12) questions scored as follows;

Never = 0; 1 day = 0.5; 1 – 2 days = 1.5; 3 – 6 days = 4.5; Everyday = 7

Respondents' scores from each question were multiplied by the severity weight for the specific question which was summed up for each individual and categorized according to the standard which is as follows;

Mild coping strategy = 0 – 50; Moderate coping Strategy = 51 – 100; Severe coping Strategy = Over 100

Mild coping strategies implied positive responses to questions 1- 2, Moderate coping strategies implied positive responses to questions 1 – 5 while severe coping strategies implied positive responses to over eight (8) or all of the twelve (12) questions.

Data Analysis

All statistical analysis with descriptive statistics was carried out using statistical package software (SPSS version 22). Data from 24-hour dietary recall was analyzed using the NutriSurvey for Windows. Data were summarized using frequency, percentage, mean, and

standard deviation. The chi-square test was used to test the relationship among variables. at $P<0.05$.**

RESULTS AND DISCUSSION

Results

Socio-demographic and Socio-economic Characteristics of the Respondents.

Table 1 shows the socio-demographic characteristics of the respondents. The minimum age of the respondents was 16 years and the maximum age was 60 years. Majority (86.2%) of the women were married 5.4% were divorced, 2.5% were single mothers and 5.9% were widows. The respondents who had primary and secondary education were 32.2% at each level, 20.7% of the respondents have tertiary education while 14.3% do not have any formal education.

Table 1: Socio-demographic and Socio-economic Characteristics of the Respondents.

Variable	Frequency (n = 203)	Percentage (%)
Location		
Alabata	47	23.2
Obandoko	52	25.6
Odeda	51	25.1
Osiele	53	26.1
Religion		
Islam	72	35.5
Christianity	131	64.5
Marital Status		
Single	5	2.5
Married	175	86.2
Divorced	11	5.4
Widowed	12	5.9
Household Size		
1-5	108	59.6
6-10	87	36.5
11-15	4	3.0
16 and above	4	1.0
Number of Children		
1-3	121	59.6
4-6	74	36.5
7-10	6	3.0
Not applicable	2	1.0
Occupation		
Artisan	46	22.7
Civil Servant	19	9.4
Farmer	35	17.2

Trader	103	50.7
Educational Status		
Primary	66	32.2
Secondary	66	32.2
Tertiary	42	20.7
No formal education	29	14.3
Monthly Income		
Below ₦30,000	97	47.8
₦30,000 - ₦49,999	15	7.4
₦50,000 - ₦100,000	58	28.6
Above ₦100,000	33	16.3

Variable	Minimum	Maximum	Mean	±	Std. Deviation
Age of respondent	16	60	36.17		9.444

Anthropometry Characteristics of the Respondents

A total of 3.4% of the respondents who participated in the study were underweight, 44.8% of them had normal weight, 36.9% of the respondents were overweight, and 18.8% were obese. It was also revealed that 31.2% of the respondents had a waist circumference value above the recommended standard for women (≤ 35 inches) while a larger percentage (69.1%) had a waist circumference value ≤ 35 inches.

Variable	Frequency (n)	Percentage (%)
Body Mass Index		
Underweight	93	45.8
Normal Weight	74	36.5
Overweight	29	14.3
Obesity	7	3.5
Waist Circumference		
$\leq$35 inches	140	69.1
>35 inches	63	31.2

Level of Food Insecurity

The Global Food Insecurity Experience scale used showed that, 47 households 23.2% were food secured, 26.6% were mildly food insecure i.e. they were worried about access to food, 29.1% were moderately food insecure i.e. compromising food quality and variety while 21.2% were severely food insecure which means that the households experienced hunger.

Food Insecurity Experience Scale (COVID-19 specific question)

A total of 39.9% of the selected households experienced mild levels of food insecurity as a result of the COVID-19 pandemic, 31.0% experienced moderate levels of food insecurity while 29.1% experienced a severe level of food insecurity due to the pandemic. The total prevalence of food insecurity due to the COVID-19 pandemic lockdown in households in Odeda Local Government Area of Ogun State was 67.5%. This study also reveals that 78.3% of the respondents employed coping strategies categorized as mild, 15.3% employed moderate

category of coping strategies and 6.4% of the households that participated in the study employed severe level of coping strategies

Table 3: Level of Food Insecurity in the Households

Category	Frequency (n= 203)	Percentage (%)
Food Secured	47	23.2
Mild Food Insecurity	54	26.6
Moderate Food Insecurity	59	29.1
Severe Food Insecurity	43	21.2
Level of Food Insecurity in the Households Due to COVID- COVID-19 pandemic		
Mild	33	16.3
Moderate	83	40.9
Severe	21	10.3
Coping Strategy Index		
Mild Coping Strategy	159	78.3
Moderate Coping Strategy	31	15.3
High Coping Strategy	13	6.4

Association Between Coping Strategy Index and Variables

Table 5 reveals that there was no significant association between the coping strategy index of the households and the household sizes of the respondents at P=0.149. A significant relationship was observed between food insecurity and coping strategy at P=0.01, as 32.5% of the respondents who were food-secured employed mild coping strategies to remain food-secured, 3.9% of study participants who experienced high level of food insecurity employed mild coping strategies, 3.4% employed moderate level coping strategies and 3.0% engaged in severe level coping strategies during the pandemic.

Table 4: Association Between Coping Strategy Index and Demographic Variables

Coping Strategy					
Marital Status	**Mild n (%)**	**Moderate n (%)**	**Severe n (%)**	**Total n (%)**	**P-Value**
Single	4(2.0)	1(0.5)	0(0.0)	5(2.5)	0.149
Married	135(66.5)	29(14.3)	11(5.4)	175(86.2)	
Divorced	9(4.4)	1(0.5)	1(0.5)	11(5.4)	
Widowed	11(5.4)	0(0.0)	1(0.5)	12(5.9)	
Household Size					
1-5	91(85.2)	12(11.1)	0(0.0)	5(2.5)	0.7
6-10	60(69.0)	18(20.7)	11(5.4)	175(86.2)	
11-15	3(75.0)	1(25.0)	1(0.0)	11(5.4)	
16 and above	4(100.0)	0(0.0)	0(0.0)	12(5.9)	
Number of Children					
1-3	100(49.3)	18(8.9)	3(1.5)	121(59.6)	0.1

4-6	55(27.1)	10(4.9)	9(4.4)	74(36.5)	
7-10	2(1.0)	3(1.5)	1(0.5)	6(3.0)	
Not applicable	2(1.0)	0(0.0)	0(0.0)	2(1.0)	
Educational Status					
Primary	46(22.7)	13(6.4)	7(3.4)	66(32.5)	0.08
Secondary	55(27.1)	7(3.4)	4(2.0)	66(32.5)	
Tertiary	40(19.7)	2(1.0)	0(0.0)	42(20.7)	
No formal education	18(8.9)	9(4.4)	2(1.0)	29(14.3)	
Monthly Income					
Below ₦30,000	65(67.0)	20(20.6)	12(12.4)	97(47.8)	0.06
₦30,000 - ₦49,999	49(84.5)	8(13.8)	1(1.7)	58(28.6)	
₦50,000 - ₦100,000	31(93.9)	2(6.1)	0(0.0)	33(16.3)	
Above ₦100,000	14(93.3)	1(6.7)	0(0.0)	15(7.3)	
Level of Food Security					
Food Secured	66(32.5)	0(0.0)	0(0.0)	66(32.5)	0.01
Mild Food Security	29(14.3)	4(2.0)	0(0.0)	33(16.3)	
Moderate Food Security	56(27.6)	20(9.9)	7(3.4)	83(40.9)	
High Food Security	8(3.9)	7(3.4)	6(3.0)	21(10.3)	

Discussion

This study was carried out to investigate the impact of COVID-19 on household food security in Odeda Local Government Area of Ogun State and the coping strategies that were adopted.

Only 6.8 % of Households that earn less than ₦30,000 monthly income represent most of the population (40.7%) were food secured while 22.5% of households with se monthly income between #30,000-50,000 experienced food insecurity. Studies have revealed that poorer households had a lower probability of being food insecure, while poorer households were more vulnerable to food insecurity (*Harris-Fry et al., 2015; Etana and Tolossa, 2017)*. It was observed that 29.0% of the respondents experienced severe food insecurity, which was similar to a study carried out by *Ibukun and Adebayo (2020)* where more than half of the households experienced severe food insecurity during the pandemic and the dominant determinant of food security was the socioeconomic status of the household in terms of education, income and wealth status.

This study reveals that 26.6% of the respondents were mildly food insecure i.e., they were worried about access to food, 29.1% were moderately food insecure i.e. compromising food quality and variety while 21.2% of the total respondents were severely food insecure. *Adepoju and Emmanuel (2021)* carried out a study on food insecurity in Ogun State and reported that more than half (61.2%) of the respondents were mildly food insecure, 20.4% and 4.1% were moderately and severely food insecure respectively while only 14.3% were food secure. A similar study by *Sani (2019)* carried out in Ethiopia revealed that the incidence of food insecurity was 53.62%, with the depth and severity of food insecurity being 16.84% and 7.32%, respectively.

Households who earn over one hundred thousand Naira (₦100000) and had tertiary education represent only 7.3% of the respondents who experienced food insecurity. *Ngema et al.*

(2018) and Abdullah et al. (2019), suggested that a higher level of education improves household economic welfare because it can influence the ability to earn wages or income required to access food, thereby improving food security. Other studies *(Ogunniyi et al., 2021; Omotayo, 2017; Olagunju, 2019)* also suggested that education is expected to lead to increased earning potential and improve occupational and geographical mobility of labour. Higher levels of educational attainment will provide higher levels of welfare (such as food security) for the household. *Tashikalma et al. (2015)* also opined that literate status can improve food security status and the adoption of improved farm practices.

Iheme et al., (2020) in a study stated that the most common dietary coping strategies employed by households in the study were shifts toward consuming less expensive/preferred foods and meal rationing and this is also evident in this study as 78% of the total respondents in this study employed low coping strategies during the pandemic. *Asesefa (2018)* revealed in a study, Food insecure households were using coping strategies such as changing consumption patterns (44%), eating inexpensive foods (72.4%), reducing meal frequency (62.4%) and selling household assets, such as household food utensils (30.8%), in this study respondents used coping strategies such as relying on less expensive food (52.2%), borrowing food from friends and relatives (22.7), reducing number of meals in a day (48.7), limit portion at mealtime (48.8).

In a study carried out by *Das et al., (2020),* it was found that around 90% of the households were suffering from different grades of food insecurity. Severe food insecurity was higher in urban (42%) than rural (15%) households. However, in this study, 76.7% of the respondents' households experienced different grades of food insecurity while the prevalence of food insecurity due to the COVID-19 pandemic lockdown in households was 67.5%.

Anxiety and uncertainty about the household food supply were very high among the respondents during the period of national lockdown; 66.5% of the total respondents were worried about not having enough food to eat while 33.5% were not worried or anxious about what to eat. A similar study by *Adepoju and Emmanuel (2021)* Identified that the majority of the selected households were anxious about the household food supply in varying degrees. Out of the respondents, 28.3% were rarely (once or twice times during the period) anxious that the household may not have enough food, 27.4% were three to ten times worried and anxious about the household food supply while 14.3% were often worried that the household members may not have access to enough food during the period.

A study conducted by *Iheme et al. (2020)* revealed that self-employed respondents were 6 times more likely to resort to household food-related coping strategies than those working in private firms or government establishments. This study identified self-employed respondents consisting of artisans, traders and farmers who resorted more to food-related coping strategies with values of 16.7%, 41.4% and 11.8% respectively.

Most of the households of the respondents fall in the range of households who had 1-5 household members out of which 34.5% experienced various levels of food insecurity and households comprising 6-10 members represent 30% of those that experienced food insecurity. *Farzana (2017)* reported that households with large family sizes are food insecure compared to those with small numbers of members. *Asesefa (2018)* also revealed that the odds of food insecurity among households having large family size (≥ 7) was 3.74 times higher when compared to that of households with family sizes less than three while *Egwue (2021)* stated in a

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study that the food-secure households had an average household size of 5 persons, while the food insecure households had 9 persons in their households.

The least practised coping strategies by the study participants were sending household members to beg and feeding working members of the household at the expense of non-working members (90.6% and 93.1%) respectively. Feeding working members at the expense of the non-working was the least commonly practised strategy (21%) in a study carried out by *Ngidi and Hendriks (2014).*

CONCLUSION

This study concluded that the COVID-19 pandemic caused an abrupt decline in the rate of food production and availability; this had negative impacts on the household food security of the respondents in terms of availability, sustainability and affordability. The pandemic also caused an aggravated increase in the level of food insecurity of respondents who were food insecure before the lockdown as most of the respondents are self-employed farmers, traders and artisans who depend on the general populace to make their daily or weekly income.

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Authors' Contributions
This study was carried out in collaboration between all authors. Authors A and C designed the study. Authors A, B and C were involved in data analysis and interpretation, the drafting of the manuscript, and critically revising the manuscript for significant intellectual content.
Competing Interest
The authors have declared that no competing interests exist.
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Consent
Written informed consent was obtained from the respondent before administering the questionnaires

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