

Innovations

Effect of Covid-19 Pandemic on Consumption and Prices of Poultry Products in Delta State, Nigeria

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Abstract:

The study was carried out in Delta State, Nigeria to evaluate the effect of COVID-19 pandemic on consumption and prices of poultry products. The specific objectives were to determine the level of consumption of poultry products before, during and after the outbreak of COVID-19; ascertain the major COVID-19 event that impacted poultry industry the most; and determine the effect of Consumer's profile on consumption of poultry products during the pandemic. The multi-stage random sampling technique was applied in the selection of 405 respondents and primary data were collected using questionnaire. Both descriptive and inferential statistical tools were used for data analysis. The result from the study indicated that 54% of the respondents were female, with average age of 26years; majority 40% had tertiary education. About 60% of the monthly expenditure of the respondents was on food items and the prices of poultry product skyrocketed 300% compared to pre-COVID-19 era, while 95% of the poultry consumers do not have access to the products during the pandemic. The multiple regression models with adjusted R^2 of 79% indicated a relatively good fit, revealing that age, gender, employment, household income, and selling price of the products affected poultry consumption in the study area. Based on the result of the study, it was recommended that government and non-governmental organizations should develop alternative sales and distribution platforms for poultry and poultry products (online resources and ecommerce) to connect producers, businesses, and consumers in any circumstances and facilitate flexible conditions for bank loans disbursement and management.

Keywords: 1.COVID-19, 2.Pandemic, 3.Consumption, 4.Prices, 5.Products.

Background of the Study:

As a measure to combat the spread of COVID-19 the Nigerian government imposed several restrictions in 2020. Some of these measures included the ban on public gatherings, closure of schools, ban on interstate travels, restrictions in international travels and imports among others. These measures affected many businesses at local and international levels. The food industry was not exempted from the effects as the crop and livestock sub sectors suffered immensely, Food and Agricultural Organization (FAO, 2020). For instance, the supply of livestock and poultry inputs such as; feeds, day old chicks and equipment declined significantly. In the same vein, local production and distribution of some food crops such as rice also nosedived and this drastically affected the forces of demand and supply and consequently affected price mechanism (Esiegwu and Ejike, 2021, and Yakubu et.al 2020).

COVID-19 pandemic has caused major disruptions globally to several agricultural (livestock, crop, and horticulture) activities across different production systems. This according to the findings of Evans (2021) has consequently resulted to significant hardships and economic losses to households. The COVID-19 created

many threats to sustainability of agriculture sector thus jeopardizing food supply, food and nutrition security. According to Nicola, Alsafi and Sohrabi (2020), there are also many secondary damaging outcomes of the COVID-19 pandemic on sustainability of agricultural systems across the world.

Considering the food supply chain which is one of the most important sectors of the economy, it has been seen that COVID-19 has affected the entire supply chain from the farm to the consumer. In the light of recent challenges in food supply chain, there is now considerable concern about food production, processing, distribution, and demand. COVID-19 pandemic led to restriction of movements, changes in demand of consumers, closure of food production facilities, restricted food trade policies, and financial pressures due to loss of income sources. This study therefore seeks to evaluate the effect of COVID-19 on price and consumption of poultry products in Delta State is apt as a step towards quantifying the magnitude of the effects of COVID-19 pandemic. The study was guided by the following research questions:

- What are the socioeconomic profiles of poultry egg producers and consumers in the study area?
- What was the average selling price of poultry products before, during and after the outbreak of the COVID-19 pandemic?
- Has the outbreak of COVID-19 pandemic affected the consumption of poultry eggs?
- How has consumer's profile affected consumption of poultry eggs during the pandemic;

Objectives of the Study

The broad objective of the study is to evaluate the effect of COVID-19 on price and consumption of poultry products in Delta State. The specific objectives are to:

- describe the socioeconomic characteristics of poultry products consumers in the study area?
- establish the average selling price of poultry products before, during and after the outbreak of the COVID-19 pandemic;
- determine the level of consumption of poultry products since the outbreak of COVID-19 pandemic;
- ascertain the major COVID-19 event that impacted poultry industry the most; and
- determine the effect of Consumer's profile on consumption of poultry products during the pandemic.

Hypothesis of the Study: The following null hypothesis guided the study.

Ho: The socioeconomic characteristics and institutional variables of consumers do not have any significant effect on quantity of Poultry products consumed during the Covid-19 pandemic

Theoretical Framework: The study is guided by the theory of consumption.

Theory of Consumption: Consumer theory is the study of how people decide to spend their money based on their individual preferences and budget constraints. A branch of microeconomics, consumer theory shows how individuals make choices, subject to how much income they have available to spend and the prices of goods and services. According to mainstream economists, only the final purchase of goods and services by individuals constitutes consumption, while other types of expenditure — in particular, fixed investment, intermediate consumption, and government spending — are placed in separate categories. Drakopoulos (2021) explained the role of consumption expenditures in modern economies and their significance for the determination of the level of output and employment in an economy. It starts with a presentation of the theory of inter-temporal choice that forms the basis of mainstream consumption functions. He further explained that Consumption represents a large part of expenditures on product markets in modern economies. Its share with respect to GDP is around 70 per cent in most advanced economies and even more in

less advanced ones. Consumption is important for aggregate demand, the total demand for all goods and services in the economy, since according to Keynesian theory, aggregate demand determines the level of output and employment in an economy: the more we demand, the more we produce and the more we create employment. Also, income that is not consumed is saved and savings have a large impact on the growth of an economy. Thus, consumption is important to understand savings, capital stock, investment, employment, and income growth.

Methods

Area of Study and Sampling Procedure: Delta State is the study area and it is one of the oil producing States in Nigeria. The State is situated in the region known as Niger Delta which falls within the South-South geopolitical zone. The multistage random sampling procedure was adopted for selection of the respondents in the study. The first stage was the selection of three local government areas (LGAs) from each of the three (3) agricultural zones of the State. This gave nine (9) LGAs. The second stage involved the selection of three (3) communities from each of the selected LGA to give a total of twenty-seven (27) communities. Stage three involved the selection of fifteen (15) poultry products consumers' twenty-seven (27) communities to give a total of four hundred and five (405) respondents for the study.

Data Collection: Data for this study were collected from primary and secondary sources. The primary data were collected through the use of questionnaire. The questionnaire was formulated for consumers of poultry products. Data were collected on each consumer socioeconomic characteristics of among which include age, educational qualification, marital status, family size, income etc. Other information that was sort from the consumers was the prices of the product before the COVID-19 pandemic, during COVID-19, after COVID-19 and current prices. Others are the level of consumption of the product before, during, after COVID-19 and at current prices.

Methods of Data Analysis: Data generated for this study were analyzed through the use of descriptive and inferential statistical tools. Descriptive statistics such as mean, percentages, tables and frequencies were used to analyze the data so as to achieve specific objectives (i), (ii),(iii), and (iv) while objectives (v) was achieved with multiple regression analysis.

Model Specification:

Multiple regression analysis was applied to estimate the effect of the socioeconomic characteristics of poultry products consumers on the quantity consumed during the COVID-19 pandemic. The model for multiple regression analysis is stated implicitly as follows;

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e)$ implicit form, while the explicit form is specified linearly as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$

Where:

Y = Quantity consumed (naira) during COVID-19 pandemic

X₁ = Age (Years);

X₂ = Gender (male=1; female=2);

X₃ = Household size (number of persons in the household);

X₄ = Marital status (Single=1; Married=2; divorced=3; Separated=4; widowed=5);

X₅ = Educational level (number of years spent schooling);

X₆ = Employment (Dummy: 1 if employed, 0 otherwise);

X₇ = Income (naira)

X₈ = selling price (number of crate)

α = Constant term; and

β_1 - β_8 = Coefficients of regression.

Results and Discussion

Socioeconomic Characteristics of Poultry products Consumers

The socioeconomic characteristics of poultry products consumers sampled are as presented in Table 1. The result indicated that 45.6% of the respondents were male while 54.4% of the respondents were female. 16.7% of the respondents have age less than 20years, 44.4% falls between 21- 30years, 24.4% falls between 31-40 years, 8.9% falls between 41-50years of age, while 5.6% of the respondents are between 51-60 years old. This wide spread is an indication that poultry products consumption is for all ages as poultry products is accepted by both young and old, the study conform with work by (Otache, 2020; Henry, 2020 and Diesner 2020). Similarly, on marital status, there is also a wide spread in consumption of poultry products as 41.1% of the respondents were single, 4.4% were Divorces, 51.1% were married while 3.4% were Widow/Widower. Also for level of educational attainment, 8.9% of the respondents had no formal Education, 11.1% had Adult Education, 10.0% had primary Education, 30.0% possessed Secondary Education while 40.0% had Tertiary Education. The spread of educational attainment is also an indication of acceptability of poultry products by all with regards to level of literacy. This agrees with Andam, Edeh, Oboh, Paul and Thurlow, (2020). Different religious groups also widely accept poultry products as among the sampled consumers, 18.9% were Muslims, 71.1% were Christians while 10.0% were Traditionalists. Even among different works of life, 34.4% of the respondents were Civil Servants, 23.3% were Traders, 18.9% were Farmers. About 10.0% were Artisans while 14.4% were into other jobs like hoteliers, businesses, unemployed among others, Bamidele and Amole (2020) posited similar results. A measure of the household size of the respondents indicate that 33.3% of respondents have household size of between 1and 5, 63.3% had 6 –10 household size while 3.4% had household size of 11–15 persons eating from the same pot. Majority of the respondents had monthly income of ₦60001- ₦80000 (27.9%) with the least group having more than ₦120,000 monthly income of 2.2%. There is a decrease in the total income of household during the COVID-19 era and this posed a substantial threat to the attainment of SDGs as reported by Ogisi and Begho (2021) on COVID-19: Ramifications for progress towards the sustainable development goals (SDGs) in Nigeria.

Table 1: Socioeconomic Characteristics of Poultry Egg Consumers:

Characteristics	Frequency (N=405)	Percentage (%)	Cumulative%	Mean/Mode
Gender				
Male	185	45.6	45.6	Female
Female	220	54.4	100.0	
Age				
Less than20	68	16.7	16.7	26 years
21-30	180	44.4	61.1	
31-40	99	24.4	85.5	
41-50	36	8.9	94.4	
51-60	22	5.6	100.0	
Marital Status				
Single	166	41.1	41.1	Married
Divorced	18	4.4	45.5	
Married	207	51.1	96.6	
Widower/Widow	14	3.4	100.0	
Educational Level				
No Formal Education	36	8.9	8.9	
Adult Education	45	11.1	20.0	
Primary Education	40	10.0	30.0	
Secondary	122	30.0	60.0	

Education				
Tertiary Education	162	40.0	100.0	Tertiary Education
Religion				
Islam	77	18.9	18.9	Christian
Christian	288	71.1	90.0	
Traditionalist	40	10.0	100.0	
Occupation				
Civil Servant	140	34.4	34.4	Civil Servant
Trading	94	23.3	57.7	70500
Farming	77	18.9	76.7	
Artisan	36	8.9	85.6	
Others	58	14.4	100.0	
Household Size				
1-5	135	33.3	33.3	8
6-10	256	63.3	96.6	
11-15	14	3.4	100.0	
Monthly Income				
<20000	23	5.6	5.6	70500
20001-40000	94	23.3	28.9	
40001-60000	99	24.4	53.2	
60001-80000	113	27.9	81.1	
80001-100000	49	12.2	93.3	
100001-120000	18	4.5	97.8	
>120000	9	2.2	100.0	

Source: Field survey data, 2022.

Monthly Expenditure of Poultry products Consumers:

Findings indicate that on the average over 60% of total monthly expenditure of poultry consumers were on food items for the sustenance of the family. The monthly expenditure as displayed in Table 2 shows an average monthly expenditure ₦75,234.00 and ₦72,580.00 for chicken consumers and egg consumers respectively.

Table 2: Distribution of Monthly Expenditure by Egg Consumers and Chicken Consumers:

Chicken Consumers			Egg Consumers		
Item	Amount (₦)	% of Total	Item	Amount (₦)	% of Total
Food	45,290.87	60.2	Food	46,088.30	63.5
Housing	13,466.89	17.9	Housing	10,814.42	14.9
Transportation	4,363.57	5.8	Transport	2,612.88	3.6
Health	3,536.00	4.7	Health	3,774.16	5.2
Education	4,965.44	6.6	Education	6,169.30	8.5
Electricity	526.64	0.7	Electricity	362.90	0.5
Water	225.70	0.3	Water	145.16	0.2
Clothing	1,655.15	2.2	Clothing	1,814.50	2.5
Security	225.70	0.3	Security	217.74	0.3
Cooking fuel	978.04	1.3	Cooking fuel	580.64	0.8
Total	75234.00	100.0	Total	72,580	100.0

Source: Field survey data, 2022.

The second highest expenditure item per month is Housing and this was 17.9% and 14.9% respectively. The monthly expenditure on education took the third position in the two groups with the chicken consumers spending 8.5% while egg consumers on the average spent 6.6%. Water and Security attracted the lowest

budgetary monthly expenditure among chicken consumers at 0.3% each and this was also the case of egg consumers who spent only 0.2% and 0.3% of the monthly budgets on water and security.

The implication of this finding is that the cost of living is high in the study area as more than half of the monthly expenditure goes into food materials for providing food security at the family households.

Average selling price of poultry products before, during and after the outbreak of the COVID-19 pandemic

Findings as shown in Table 3 indicate that there was a very big increase in the price of crate of egg during the COVID-19 pandemic as the price moved up sharply from ₦789 to a ₦2,500 during the pandemic. This showed a sharp increase by over 300% of the former price before the COVID-19 period, the price of one kilogram of chicken before COVID-19 pandemic was N2000, this sharply moved to N4500 during the COVID-19 era and stabilized to N3500 thereafter. The report of Esiegwu and Ejike (2021) that during the COVID-19 pandemic the supply of livestock and poultry inputs including feeds, day old chicks and equipment as well as such other COVID-19 events as lockdown, ban on interstate movements all joined to escalate the price of eggs during the period. The average price per crate has stabilized to ₦2000 after the pandemic.

Table 3. Average selling price of poultry eggs before, during and after the outbreak of the COVID-19 pandemic

Variables	Pre COVID-19 era June 2019 – Dec 2019	During COVID-19 era June 2020 – Dec 2020	Post COVID-19 era Dec 2021 - June 2022
Price per crates	789	2500	2000
Price per kg chicken	2000	4500	3500

Source: Field survey data, 2022.

Egg Consumption during COVID-19 Pandemic:

The availability and consumption of poultry products to the respondents during the COVID-19 pandemic in the study area is as presented in Table 4. The result from this study shows that 94.5% of the respondents did not have access to poultry products during the period and hence did not include it at all in their meals while over 1.1% indicated the availability of poultry products at times. This indicated that the eating of poultry products during the pandemic era was not a regular occurrence for the respondents. Only 3.3% indicated that poultry products were available most often. On how often poultry products were consumed by the respondents in the pandemic era, over 63% have no particular order of time in consumption of the products. This could be due to the high cost of the product occasioned by the pandemic and the associated hike in prices of production inputs. None of the respondents consumed poultry products on daily basis, while 10.0% indicated consuming poultry products weekly. Similarly, 5.6% recall consuming poultry products twice a week while 4.4% is thrice weekly and 6.7% consumed fortnightly. The implication of the low rate in the schedule of consumption of products indicated that the protein intake among the respondents during the period was very low. The negative impact of low protein intake, particularly among women and children cannot be overemphasized and the report conform to studies by Vasavada (2020); and Staniforth (2020). There are many factors associated with consumers' preference for poultry products consumption which include taste, affordability, availability, presentation form/package form, convenience and certain sensory characteristics among others. But in the case of the era of COVID-19 pandemic where the cost of poultry products has become so high, consumers have no preference; rather affordability was the major factor in determining their rate of consumption (Cranfield, 2020).

Table 4: Availability and Consumption of Poultry Egg

Consumption Question Items	Frequency	Percentage	Cumulative Percentage
(i). How often did you access poultry eggs in your area in the era of pandemic?			
Not at all	4	1.1	1.1
At times	383	94.5	95.6
Most often	14	3.3	98.9
Every time	4	1.1	100.0
(ii). How often did you personally consume poultry eggs during the pandemic?			
Everyday	0	0.0	0.0
Weekly	41	10.0	10.0
Twice a week	23	5.6	15.6
Thrice a week	18	4.4	20.0
Fortnightly	27	6.7	26.7
Monthly	41	10.0	36.7
No particular order of time	255	63.3	100.0

Source: Field survey data, 2022.

Effect of Poultry products Consumers' Socioeconomic Characteristics and Institutional Variables on Quantity Consumed:

Multiple regression analysis was conducted to show the effect of socioeconomic characteristics of poultry consumers on quantity consumed during the Covid-19 era. Four functional forms of the regression model were tried on to determine best line of fit, and these included; linear, semi-log, double log and exponential models. After thorough considerations of the statistical, economics theory of consumption and econometric criteria, the semi-log functional form was adopted for the analysis.

The model applied indicated a relationship between quantities of products consumed (Y) and some explanatory variables which include Age, Gender, Household size, Marital status, Educational qualification, Employment status, Income and Selling price of products

According to the result as shown in Table 5, the coefficient of determination (R^2) was about 0.79 and it means that all the variables considered in this model accounted for about 79% variations in the quantity of products consumed during the period under review. The F-ratio was 17.5 which indicated the whole regression equation was significant at the 0.01 level.

A detailed discussion of the result showed that five of the variables entered into the model were statistically significant on their effect on consumption of products. Among them are age, gender, employment, income and the selling price. The coefficients of age and the selling price were found to be negative. The Age coefficient has a value of -0.3435 with a t-value of -2.728 and it is significant at the 5% level. This implies that as the respondents increased in age, their desire to consume poultry products decrease. This finding is in line with the report of Oluwafemi et.al.(2015) that studied the determinants of household consumption of eggs in Oyo State, Nigeria.

Table 5: Effect of Socioeconomic Characteristic on Quantity of Products Consumed:

Variables	Linear	Semi-log +	Double log	Exponential
Constant	0.5856** (2.2706)	0.4725*** (5.114)	-0.7175*** (-3.1658)	0.3569 (0.3622)
Age	-0.4126 (-0.5684)	-0.3435** (-2.728)	0.7120*** (3.9344)	0.1233 (0.4896)
Gender	0.5468** (2.6856)	0.1648*** (4.109)	-0.1785 (-1.1717)	0.4855 (0.1203)
Household size	0.3698 (1.1357)	0.1872 (0.211)	-0.8965*** (-4.7259)	2.3427 (0.4756)
Marital status	0.6896 (1.8219)	0.0589 (0.686)	0.6985 (0.2754)	1.0860 (0.62630)
Education	-0.7862** (-2.8547)	0.2194 (0.295)	0.4825*** (3.2036)	-2.4751*** (-3.9132)
Employment	0.8896** (2.0843)	0.3619*** (3.228)	0.3269*** (5.7789)	0.6676 (0.9800)
Income	0.2036 (-1.1336)	0.2374*** (3.873)	0.4758 (0.3256)	-5.8063 (-1.9819)
Selling price	-0.6896 (1.8219)	-0.9941*** (-4.8707)	0.6985 (0.2754)	1.0860 (0.62630)
R²	0.3983	0.791	0.6257	0.4440
Adjusted R²	0.3789	0.706	0.5951	0.4128
F-ratio	5.6524***	9.452***	4.1245***	2.2401**

Source: Field survey data, 2022.

Note: ***Significant at 1%, **Significant at 5%
t-statistic in Parenthesis

Gender has a coefficient of 0.1648 with a t-value of 4.109 and it is statistically significant at 1% level. This implies that being a female is positively related to poultry products consumption. Also being employed (0.3619) and having more income (0.2374) were all positive and statistically significant on their influence in products consumption among consumers. The implication is that an employed person and a person who has high income has the purchasing power to buy more poultry products than one with no employment or suffering from low income, all things being equal.

The selling price on the other hand negatively affected consumption and it is statistically significant at the 1% level. The implication is that with an increase in purchase price, all things being equal will lead to fall in demand which subsequently lowers consumption. This finding is in tandem with the report of Darnhofer, (2020) and also obeys the economic theory of law of demand.

Conclusion:

This study evaluated the effect of COVID-19 on price and consumption of poultry products in Delta State, Nigeria. The specific objectives were to: ascertain the socioeconomic characteristics of smallholder poultry consumers in Delta State, establish the average selling price of poultry products before, during and after the outbreak of the COVID-19 pandemic, determine the level of consumption of poultry products since the outbreak of COVID-19 pandemic, ascertain the major COVID-19 event that impacted poultry industry the most and determine the effect of Consumer's profile on consumption of poultry products during the pandemic, and results indicated a negative effects of the pandemic on poultry products consumption in the

study area. Based on the findings in this study, the following recommendations are made: determinants that are positive related to overcoming the menace of the pandemic should be developed and improve upon, Develop alternative sales and distribution platforms of poultry and poultry products (online resources and ecommerce) to connect producers, businesses, and consumers in any circumstances, Formulate and implement strategies to reduce the spread of misleading information regarding livestock during crises and Ensure Government financial incentives reach all vulnerable stakeholders and facilitate flexible conditions for bank loans and repayments.

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