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Consumption Expenditure and Preferences for Animal Products among Low-Income Households in Makurdi Metropolis, Benue State, Nigeria

Francis Ozoko Ogebe¹
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Abstract

The consumption expenditure on beef, fish, egg, pork and chicken was investigated using data obtained from randomly selected 80 respondents. It was revealed that, except in the case of fish and beef which had consistent position in the preference ranking, there is no consistency between the households' consumption preference ranking based on desire and their consumption frequency ranking based on purchasing power. Fish was the most preferred as well as the most frequently consumed by the low-income households. Educational level, household size, age and monthly income were the major factors through which total expenditure on the selected animal products can be explained. Income elasticity of household expenditure was low (0.121) signifying that increasing household monthly income may be a veritable way of stimulating animal protein consumption among the low income urban dwellers. Furthermore, policies that discourage large family sizes, and sensitization on the importance of animal protein intake will help to increase the animal protein consumption of households.

Keywords: *expenditure, households, preference*

JEL Classification: *D12*

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1. Introduction

The attainment of adequate nutritional level is an important criterion in evaluating the success of development policy. The primary objective of Nigeria's development has been to achieve a rapid increase in the standard of living of the average Nigerian. This stems from the sole role played by adequate nutrition as a precursor for good health which could lead to increased productivity. Furthermore, the concern for food stems from its role in the sustenance of human life and the release of energy measured in calories for body metabolism and growth. In Nigeria, the initial consideration for any food is the cost, followed its quality as peoples' purchasing power continues to fall. The value of food lies in its capacity supply the essential nutrients. Today, the economic recession in Nigeria coupled with the global economic crisis, has shifted the average consumption among various household to the negative direction such that an individual is no longer interested in the quality of food he consumes, but in the quantity.

Nigeria with numerous natural and human resources still it faces acute levels of protein consumption (Ajana, 1999). According to estimates of Abiodun (2001), the protein intake by Nigeria is about 53.8g with only 6.0 to 8.44 g/head/day of fish and animal origin while the United Nation/Food Agricultural Organization FAO estimated minimum protein requirements of 70gm/ capita/ day and the recommended protein intake from animal source to be 35gm/ capita/ day. It is not surprising that Nigeria is highly deficient in animal protein security with the per capita consumption put at 9.3 g/day as against minimum 35g/day recommended by FAO (Esobhawan, Ojo, & Ikheloa, 2008). The result of the situation is evidenced by the record of increasing cases of nutritional deficiency symptoms and relatively reduced resistance to diseases (Akinyele, 2005).

Generally, the consumption of animal protein is very low in Nigeria. Atobatele and Aromolaran (1989), estimated per capita per day animal protein intake of urban and rural dwellers in Ibadan area to be 9.56 grams and 2.38 grams respectively. These figures are indeed very low compared with the standard daily per caput animal protein requirement of 35-45 grams recommended by FAO. A few studies in the past have attempted to identify the factors that could

have been responsible for this low level of protein intake in general and animal protein in particular. According to the socioeconomic regression estimations of per capita protein consumption in Ibadan, Nigeria, Omolaran (2004) showed that household size and household income were significant determinants of the level of daily per capita protein intake.

This study was carried out partly to contribute to the search for knowledge on the various socio-economic factors that may serve as useful policy targets when policies are to be directed towards the improvement of the level of animal protein intake by Nigerian consumers. In addition, most of the studies on animal protein consumption have neglected questions on the preferences of consumers and frequency of consumption for each animal product. The relevant questions here are; what is the order of preferences of the consumers among the most common animal products? What animal product is most frequently consumed? And what is the relationship between the consumers' preference for and the frequency of consumption of various animal products?

The broad objective of this study is to analyze the consumption expenditure and consumer preference for selected animal products among the low- income households in Makurdi Metropolis of Benue State, Nigeria.

Specifically, the study was conducted to:

- (i) Determine household consumption pattern of selected animal products;
- (ii) Analyze preference pattern for animal products by low- income households; and
- (iii) Identify the major determinants of expenditure on the selected animal products among Low- income households in the area

2. Literature Review

Nigeria is amongst those developing countries where low levels of income per capita is hindering in increase in meat consumption from protein (Food and Agricultural Organization [FAO], 2000). This shortage of animal protein consumption is acute in Middle Belt of Nigeria, which nutritionists coined to shortage of animals relative to population growth (Omolaran, 2004). Obi (2003) stated that because

of harsh economic conditions people of Nigeria are resorted to cheaper plant based proteins. Atobatele and Aromolaran (1989) estimated per caput per day animal protein intake of rural dwellers in Ibadan, Nigeria to be 2.38 grams. This amount is very small compared with the standard daily per caput animal protein requirement of 35-45 grams. Studies have attempted to identify the factors that could have been responsible for the low level of protein intake in particular. Aromolaran (2004) estimated a regression equation of per caput protein intake on a number of socio-economic variables for consumers in Ibadan, Nigeria and household size and household income as significant determinants of the level of daily per caput protein intake. Similarly, Akinwumi, Odunsi, Omojola, Aworemi and Aderinola (2011) reported that animal sources of protein are the most preferred and their demand is highly influenced by household size and income.

In Nigeria, meat, fish and other animal products are the fourth most commonly consumed food group (88.9%) by households. Its consumption lags behind grains and flours (97.2%), oils and fats (96.8%) and vegetables (96.7%). Compared to other food groups, average weekly household expenditure was highest for meat, fish and animal products (₦1, 359 per week) (National Bureau of Statistics [NBS], 2016). A variety of meat products are purchased across the country, the acceptance and popularity of each meat product varies by region. Household demand for meat products are faced with problems which is mostly due to market prices, consumer taste, credit availability and consumer wealth.

Empirical studies have enlisted socio-economic and demographic factors which have considerable influence on food expenditures in several countries. Correlation analysis on poultry consumption performed by Billah, Nargis, Hossain, Howlider and Lee (2013) for the case of Bangladesh confirmed that age, education level, family size and annual income significantly influenced poultry consumption in estimating the determinants of meat consumption patterns. The Almost Ideal Demand System (AIDS) used by Moni (2014) confirmed that socio-economic factors such as age of household head, educational level, gender, household size and off-farm income were important in explaining perceived variation in the consumption patterns. Based on binary logit

regression method, Aral et al. (2013) stated that gender, education, house size and income are significant determinant of red meat consumption in Turkey. Upadhyay, Pandey, and Singh (2014) employed regression analysis in determining consumption patterns of fish in urban area of Tripura. Results revealed that fish price, number of adult members in the family, quantity of consumption of chicken and mutton affected the quantity of fish purchased. The above findings show that both socio-economic and demographic factors influence consumption levels of meat/ meat products.

Several models have been developed to express the relationship between the consumption and the relevant explanatory variables. These include the Linear Expenditure System (LES), the Almost Ideal Demand System (AIDS) and the combination of these two systems into a Generalized Almost Ideal Demand System (GAIDS) (Deaton & Muelbauer, 1980).

Similarly, Nayga (1995) studied household consumption and expenditure using AIDS model and observed that age, education, household size and region has a statistically significant effect on meat expenditures. Castellon, Boonsaeng, and Carpio (2015) used budget share of Consumer Price Index (CPI) to construct Stone-Lewbel (SL) price indices that could be used to estimate a demand system where prices are absent.

3. Empirical Model and Method

3.1. The Study Area

The study was carried out in Makurdi Metropolis of Benue State, Nigeria. Makurdi is located in the middle belt area of Nigeria. It is located between latitude 7.40°N and longitude 8.37°E. It lies within the transition belt between the equatorial rain-belt of the southern Nigeria and open grassland savanna vegetation of the north. It has annual rainfall of 1500-1800milimeters, with a total population of three million, three hundred and seventy-seven (3,300,377) people (National Population Census (NPC), 2007).

3.2. Data Collection

A survey approach was used for data collection. Questionnaire were administered each to a randomly selected low-income households in each of the three districts of the Metropolis. Total of 120 low-income households were randomly selected for questionnaire administration. The sampling was done randomly within this category of households. To make sure that low –income households were selected, Income-wise Distribution technique was adopted to classify the households into three groups based on their monthly family income. For the purpose of the study, households that earn less than or equal to ₦40,000 were classified as low-income group (LIG). Those earning above ₦40,000 and ₦80,000 were classified as middle income group (MIG) while those that earn above ₦80,000 were grouped as high income group (HIG). In addition, the study utilized the data of National Bureau of Statistics (NBS) in Nigeria, which undertook an income, consumption and expenditure survey in 2016-2017.

Techniques of analysis adopted include the paired comparison preference ranking technique (Harper & Eastman, 1980) and regression technique. The study covered only 5 animal products namely egg, chicken, fish, beef and pork which were the most prevalent meat products in the study area.

3.3. Data Specification

The study specified a consumption expenditure function as: $C = f(X_1, X_2, X_3, X_4, X_5, U)$

Where:

X_1 = Household size (no. of persons) X_2 = Age of the household head (years)

X_3 = Sex of household members (Male=1, Female=0)

X_4 = Level of education of the household head (no. of years)

X_5 = Monthly income of household (₦)

U= Error term

C= Total expenditure on the five animal products (₦)/month

Four functional forms: linear, double-log, semi-log and quadratic were used on the data collected during the process of estimation of regression co-efficient for the specified socio-

economic factors. The paired comparison ranking technique was used for investigating whether the ‘effective-demand-based preference ranking’ is consistent with the “desire-based preference ranking” of the five animal products by low-income household.

The paired comparison ranking technique is an element ranking technique in which all elements of the set to which preferences ranking is to be made are paired and exhaustively compared by the respondents whose priority ranking are to be determined. A pair-wise comparison (PC) matrix is then set up. Every cell in the matrix presents the total numbers of the subjects in the row scored over the subject in the column.

The pair-wise score which is used to judge preference ranking is simply the sum of all the scores each subject in the row scored over that in the column. The various scores are then subjected to the LSD (Least Significant Difference) to test for statistical significance of the difference between every estimated adjacent score. The difference between the two adjacent scores is judged to be significant if it is greater than the calculated LSD (Atobatele & Aromolaran, 1989).

$$\text{LSD} = t_a \left[\frac{B(n)(n+1)}{6} \right]^{1/2} \quad (1)$$

Where:

LSD= Least significant difference

B= number of households

n = number of products t = tabulated t-value

a = the significant level at which the test was carried out.

4. Results and Discussion

4.1. Household Consumption Patterns of Selected Animal Products.

The average household head was found to be 42 years of age, with a minimum of secondary school education and an average monthly income of ₦40,000. Ninety percent (90%) of the household heads were salary earners with average household size of 9 persons indicating a large household size. This implies that the household animal protein requirement may not be adequately catered for since

more number of persons in the household means a reduction in the per capita expenditure on animal products if income remains constant.

The result of the analysis of expenditure of respondents indicates that households on average spent ₦12,000 of their monthly income on consumption of these selected animal products. That is, the average household expended about 30% of their monthly income on fish, beef, egg, chicken and pork. Households in the study area consumed fish 17 days in a month, beef 12 days in a month, pork 9 days in a month, eggs 10 days in a month and chicken 2 days in a month.

The results of the study also revealed considerable change of intake levels of fish, meat (beef/chicken), and eggs in the past five years. Results in (Table 1) showed that 8.3%, 25%, 42.5%, 25% and 24.2% of the household stated that their consumption of fish, beef, egg, chicken, and pork respectively did not change significantly in the past five years. While, 91.7%, 75%, 57.5%, 75% and 75.9% claimed to have experienced significant changes in their intake level. For fish, 16.7% of the latter category of the household experienced a significant decrease in intake relative to what it was five years earlier, while 75.0% experienced an increase. Of the 75% that experienced a change in the level of beef intake, only about 33.3% decreased their intake while 41.7% increased theirs. Finally of the 75.9% that experienced changes in pork consumption, 41.7% decreased, while 34.2% increased. The major reason given for the observed increase in the level of households animal products intake were increase in household income (60.6%), increased desire for the product, (28.7%) reduced number of dependents (9.40%), and reduced prices of other food items (1.3%).

On the other hand, the reasons for observed decreases in households animal products intake level include increase in price of the products and other food items, (58.3%) increased non-food expenditure of the household head (34.1%) and reduced desire for the products (7.6%).

Table 1: Monthly Expenditure and Changes in Consumption Levels of the Selected Animal Product

Variables	Days Consumed per Month	Expenditure	%Increase	%Decrease	No Change
Fish	17	5000	75.0	16.7	8.3
Chicken	12	3000	41.7	33.3	25.0
Beef	10	1000	44.2	13.3	42.5
Pork	2	1000	41.7	33.3	25.0
Total	9	2000	41.0	41.7	24.2

Monthly Expenditure (₦) =12000
Monthly Income (₦) =40000 Household size 9.0

Source: Survey Data, 2018

4.2. Paired Comparison Matrix for Consumption Preference of Households for Selected Animal Products Based on Desire

Table 2 showed that fish, with a score of 369 is the most preferred animal protein source in the study area, when the priority ranking is based strictly on desire and not actual purchases. The major reason given for this is that fish is readily available and easy to prepare. Chicken is the next with a score of 294, followed by beef with a score of 248, then egg with a score of 148 and lastly pork which had a score of 141. The Table further revealed that 96 of the 120 respondents preferred fish to beef, 108 preferred fish to egg, 7 preferred fish to chicken and 91 preferred fish to pork. This resulted in a total score of 369 for fish. The LSD calculated at 5% significant level was 40.61. Since the difference between 369 and 294, 294 and 248, 248, and 148, 148 and 141 were all greater than 40.61, all the five rankings were significantly different. The preference for chicken by those who preferred was mainly due to its unique taste and meat quantity. For beef, the reason for preference was availability and habit. Eggs were preferred by the respondents who do primarily because of its nutritional quality.

4.3. Paired Comparison Matrix for Consumption Frequencies of Household

Table 2 showed that fish was again ranked first based on purchasing power, followed by beef, egg, chicken and pork in that order. Comparing the rankings on Table 2 and 3, it can be seen that except in the case of fish and beef, which showed consistency in their ranking positions (1st and 3rd), the ranking positions for the other

three products differed significantly. Hence there is a significant difference between the desire- based consumption preference and the purchasing power-based consumption frequency ranking among the low-income households in the study area.

Table 2: Paired Comparison Matrix for Consumption Preference of Households for Selected Animal Products Based on Desire

	Fish	Beef	Egg	Chicken	Pork	PC Score	Rank
Fish	-	96	108	74	91	369	1 st
Beef	24	-	99	47	78	248	3 rd
Egg	12	21	-	33	82	148	4 th
Chicken	46	73	87	-	88	294	2 nd
Pork	29	42	38	32	-	141	5 th

LSD0.05= 40.61

Source Survey Data, 2018

Table 3: Paired Comparison Matrix for Consumption Frequencies of Households for Selected Animal Products Based on Purchasing Power

	Fish	Beef	Egg	Chicken	Pork	PC Score	Rank
Fish	-	108	105	118	100	431	1 st
Beef	12	-	49	107	73	241	3 rd
Egg	15	71	-	92	85	263	2 nd
Chicken	2	13	28	-	58	101	5 th
Pork	20	47	35	62	-	164	4 th

LSD0.05 =40.61

Source: Survey data, 2018

4.4. Potential Factors Determining the Level of Expenditure on Animal Products

Four functional forms were used in assessing the determinants of expenditure on the selected animal products consumption in the study area. These are Linear, Double logarithmic, Semi logarithmic and Quadratic functional forms. Results in Table 4 revealed that the four equations showed very good fit (R^2). The R^2 values in the models is an indication that 96% of the variation in the expenditure is explained by the explanatory variables. Other factors like prices of meat products, price of substitutes, taste, religion belief etc. might be some of the factors not captured in the models. The models showed that household monthly income (X_5), household size (X_1),

age of household head (X_2) and level of education are statistically significant. The types of significant coefficients however vary from one functional form to the other.

According to the results, coefficients of household income, household size and age variables had positive signs implying that for any unit increase in any of these variables there was an increase in the monthly expenditure on the selected products in the study area. The coefficients of education was consistently negative but statistically significant in all the models implying that as the level of education of consumers increase the expenditure on animal products decreases. Sex of household member (X_3) was found to be consistently statistically insignificant. In summary, the monthly household income, the household size, age of the household head and level of education were found to be the major factors through which variations in the level of household expenditure on animal protein intake by household in the study area can be explained and predicted. This result is in agreement with the findings of (Aromolaran, 2004) who stated that the amount an average low income urban household spends on animal products is strongly influenced by household size, household income, and age of the household head and level of education of household head. This implies that if income remains constant, the per-capita expenditure on the selected animal products will continue to reduce as household size continues to increase. Also, as the consumers advance in age, their consumption of animal protein decreases. This is in line with the *a priori* expectation because consumers are expected to reduce protein intake consumption as they grow older. Although, age determines inability of consumers to consume animal proteins, it however enhances the preference to consume a particular class of protein. According to Anotonety et al. (2018), older people become more conscious of their health and nutrition and as such reduce intake of animal protein than young ones.

Similarly, as the level of education of the consumers increases the expenditure on animal products increases. This agrees with the findings of Inyanbe and Orewa (2009) who found out that education is the important determinant of protein intake in rural and Low- income urban households in Nigeria. The income elasticity of expenditure on beef, chicken, egg, pork and fish is 0.227. That is for

every 10% increase in monthly household income, expenditure on the five selected animal products will increase by 0.23% given that prices are kept under check. Furthermore the estimated elasticity of household expenditure with respect to household size is very low (1.16). The implication of this is that any marginal increase in household size is more likely to reduce the per capita expenditure on animal products by the average household, if income remains constant. This finding is also in tandem with theoretical expectation since increase in household size is accompanied by increase in demand for consumption goods (Olagoke, 1983).

Table 4: Regression Results for the Estimation of Factors that Determines the Level of Expenditure on Animal Products

Variables	Linear model		Double log model		Semi-log model		Quadratic model	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
X1(Hs)	1.161*	0.053	0.090*	2.792	792.28**	2.354	-9.565*	-2.879
X2(Age)	20.117*	4.627	0.185*	4.902	1753.274*	4.443	-2.475*	0.015
X3 (Sex)	7.443	1.068	-0.003	-0.062	95.624	0.209	-0.314	-0.709
X4(Edu.)	-60.344*	-2.638	-0.081*	-6.517	-709.697*	-5.496	13.691*	3.081
X5(inc)	0.227*	41.584	1.444*	42.532	6623.544*	23.611	1.13E-6*	5.295
R²	0.980		0.972		0.915		0.987	
Adj R²	0.979		0.971		0.911		0.986	
Variables	Linear model		Double log model		Semi-log model		Quadratic model	
F-value	1.120E-3		796.285		244.045		814.709	
Constant	-1963.249		-3.899*		-68905.0*		583.132	
N	120		120		120		120	

Source: Survey Data, 2018 * , ** , Significant at 1% and 5% respectively.

5. Conclusion and Recommendations

The study has shown that a consumer will prefer a commodity X to a commodity Y when the base for the preference ranking is desire, and will prefer Y to X if the preference ranking is based on purchasing power. Hence, low-income households in the study area do not consume more frequently those animal products they prefer more, majorly due to economic reasons. Among the low-income households, fish was the most preferred as well as the most frequently consumed. The intake of the investigated products has witnessed substantial increase among majority of the households as a result of increased level of household income per capita and improved attitude towards the intake of meat products. Household income, household size and the number of years of education of the

household head are major determinants through which variations on the level of household expenditure on animal protein intake by households in the study area can be explained or predicted. The estimated elasticity of household expenditure with respect to increase in household size is as low as 0.27 suggesting that any marginal increase in household size is more likely to reduce the per-capita expenditure on animal protein consumption by the average household, if income remains constant. Thus, any policy aimed at improving the animal protein intake of Nigerians may not succeed if the present problem of low level of per capita real income of the household is not adequately addressed.

Based on the findings, the following recommendations are pertinent:

1. Population policy should emphasize not too large household size among urban dweller so as to increase the real per-capita expenditure on the selected animal products among the households.
2. Appropriate programs should be directed towards improving per-capita real monthly income of Low- income urban households by provision of employment so that more household members will become earners thereby reducing the dependency ratio.
3. Since price increase reduces the real income of the households, efforts need to be directed towards stabilizing the retail prices of animal products by the government.

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