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Consumption Frequency of Selected Animal Protein Sources Among Rural Households in Enugu State, Nigeria

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ABSTRACT
The study analyzed frequency of consumption of selected protein sources among rural farm households in Enugu State, Nigeria. A sample size of 50 rural households in the study area were selected through a multi-stage random sampling technique. Primary data were collected through the use of structured questionnaire. Data were analyzed using descriptive statistics as well as Probit Regression model. The results show crayfish (99.3%), milk (98%), fish (96.0%), cow meat (94%), Chicken (92%) were the animal protein sources most readily available to the rural households in the area. Nevertheless, he results further show that crayfish ($\bar{x}$ = 6.62), fish ($\bar{x}$ = 5.94) and cow meat ($\bar{x}$ = 5.04) were the frequently consumed animal protein sources while pig meat ($\bar{x}$ = 2.18) was scarcely consumed by rural household in the study area. Furthermore, factors such as household size/composition, knowledge of relevance of protein, household's choice of meat were positively related to frequency of consumption of animal protein sources at 1% significant level. On the other hand, factors such as variety of household meals, household educational status were negatively related to frequency of consumption of animal protein sources at 5% and 1% significant levels respectively. Therefore, the study recommended that nutritional enlightenment campaign should be mounted in the area to encourage rural households incorporate readily available and affordable animal protein sources especially crayfish and fish, and cow meat in their meals as conscious efforts to boost household protein intake.

Key words: Consumption, Animal Protein Sources, Frequency, Rural households

INTRODUCTION

In Nigeria, food supply is not distributed equally throughout the country and sometimes within the households. A large proportion of the populace including children, do not receive balance diet to ensure physical health and development. Most people consume the minimum level of calorie but fail to get necessary protein and essential vitamins and minerals required for leading a healthy life (Onyeneke and Nwaiwu, 2012). Proteins are the major structural components of all cells of the body and amino acids are the building blocks of protein. Proteins can function as enzymes, membrane-carriers and hormones (Jensen, 1994). As far as the human body is concerned there are two different types of

amino acids: Essential and Nonessential. Nonessential amino acids are amino acids that the body can create out of other chemicals founding the body. Essential amino acids cannot be created, and therefore, the only way to get them is through food. Protein contains approximately 22 amino acids, eight of which are essential because the body cannot produce them. Therefore, they must be obtained from food consumed (Adetunji and Adepojo, 2011). Protein is required for the growth, maintenance and repair of all body tissues. Protein form the foundation of muscles, skin, bone, hair, heart, teeth, blood and brain and the billions of biochemical activities going on in the body every minute. When inadequate amount of protein is consumed the blood and tissues can become either too acidic or too alkaline (Adetunji and Adepojo, 2011). Lack of dietary protein can retard growth in children and in adult, can be a contributing factor in chronic fatigue, depression, slow wound healing and the decreased resistance to infections (Iyangbe and Orewa ,2009)

It has been estimated that the daily minimum crude protein requirement of an adult in Nigeria varies between 65 and 85g per person. However it is recommended that 35g of this minimum requirement should be obtained from animal products (Oloyede, 2005). Protein is a common phenomenon in the health status of many Nigerians as level of it is responsible for wide spread under nutrition and malnutrition among ages (FAO, 2006 cited in Ume and Okoronkwo, 2013). Malnutrition problems in the developing countries like Nigeria can also be examined in terms of the macronutrients (calorie and protein intake) as well as the inadequate consumption of micronutrients (Abdulai and Aubert, 2004). The inadequate intake of these nutrients hinders healthy growths, affects the individual's ability to undertake productive activities, and lowers the utilization of other nutrients (Aromolaran, 2004 and Amao, 2013). So the starting point towards arresting the problem of malnutrition and undernourishment and raising the level of nutrition must be first to ascertain the consumption pattern of essential food like protein which are indispensable for growth and development especially animal protein which contains more of the amino acid needed by the body.

It is well-known that Nigeria's per capita intake of high-quality protein is too low. Even in Enugu State Nigeria, there are observable incidence of infant mortality, low resistance to diseases, poor child growth and development, mental retardation common among children of rural household which comes as a result of inadequate protein in the diets. An adult needs approximately 3,500 calories and 50grams of protein per day; a one-year-old child needs about 1000 calories and 15grams of protein per day. Yet, these quantities of essential nutrients are deficient in the diets of many rural household in Nigeria who consume mostly staples of grains such as maize, without adequate nutritional supplements, Thus, dependence on these staples cause malnutrition especially among resource-poor households (Robert *et al.,*2000

The deficiency of protein in the diet will invariably affect the income generating ability, manpower development and overall contribution to the nation's Gross Domestic Product. All the while, knowledge of consumption of animal protein sources in Awgu Agricultural Zone of Enugu State, Nigeria has been based on mere assumption and not on any empirical evidence. There is therefore the need to fill the gap of shortage of empirical evidence of the status of protein consumption in the area especially among the resource poor rural farm households. Therefore, this paper seeks to analyze of consumption of animal protein sources among rural farm households in Awgu Agricultural Zone of Enugu State, Nigeria. The specific objectives of the paper are to:

i. examine socio-economic characteristics of the respondents;

ii. ascertain the major animal protein sources in the study area;
iii. assess the frequency of consumption animal protein sources
iv. determine household socio-cultural factors affecting consumption of animal protein sources in the study area.

METHODOLOGY

This study was conducted in Awgu Agricultural Zone of Enugu State, Nigeria comprising of Awgu, Aninri, Enugu South, Nkanu East, Nkanu West and Oji River Local Government Areas (LGAs). The zone is bounded on the East by Ebonyi State, on the North by Enugu Agricultural zone of the State, on the South by Abia State and on the West by Anambra State. A multi-stage random sampling technique was employed select respondents for the study. In the first stage, two local Government Areas in the Zone were selected by simple random sampling technique. The second stage was the selection of five communities in each sampled LGA by same simple random sampling technique. Similarly, the third stage was sampling of five rural households in each of the sampled communities giving a total of fifty respondents for the study.

Data obtained for the study were analyzed using both descriptive such as frequency counts, mean and percentages and Probit regression model. Specifically to assess the frequency of consumption of animal protein sources in the area respondents were required to indicated their responses using a 7- point Hedonic measurement scale weighted as follows Every day (7), 5-6day/week (6), 3-4 days/week (5), 1-2 days/week (4), once in 2weeks(3), only during festivities (2), never (1). The scored responses were also calculated and pooled to obtain mean frequency of consumption. The status of frequency of consumption was established in a 3-category frame by dividing the maximum response value (7) by the 3 categories to obtain class mark of 2.33 which successively delineated the categories thus 0.00 - 2.33 as scarcely consumed, 2.34 - 4.67 as occasionally consumed and 4.67 - 7.00 as frequently consumed as employed by Madukwe, *et. al* (2000).

Furthermore, Probit regression model statistics estimating the relationship between selected households' socio-cultural factors and the frequency of consumption of animal protein sources in the study area is explicitly expressed as follows:

$$Y_i^* = B_i X^*_i + ei \quad (1)$$

$$Yi^* = O \text{ if } Xi^* = o \quad (2)$$

$$Yi = I \text{ if } Xi^* > o \quad (3)$$

Where,

Y= consumption frequency of animal protein sources (proxied by the probability of responses where frequently consumed =1, otherwise =0)

X_1 = Use of Household's menu (Yes=1 otherwise = 0)

X_2 = Households' composition (Yes=1; otherwise =0)

X_3 = Household's Educational status (Yes=1; otherwise = 0)

X_4 = Household's Cultural affiliation (Yes=1, otherwise=0)

X_5 = Households' Religion (Yes= 0 otherwise)

X_7 = Wealth status of the Household (Yes=1; otherwise=0)

X_8 = Household's Taste for Meat (Yes=1; otherwise=0)

e = error term

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Results in Table 1 shows that the mean age of the respondents was 48years. This implies that most of the respondents in the study area were still in their active stage in life which will enhance their farming activities as well as agricultural production efficiency for household food security. This result conformed with findings of Nze and Azubuike (2016) that most farmers in Abia State were in their productive ages and were thus able to cope with the challenges of agriculture. Furthermore, results show that majority of the respondents (68%) were males. This indicates that males were actively committed to ensuring food availability in their households as well as determining what should be consumed.

Table 1 Distribution of respondents according to their socio-economic characteristics (N=50)

Variable	**Frequency**	**Percentage**
Age (years)		
<30	1	2.0
31-39	10	20.0
40-49	19	38.0
50-59	12	24.0
60 and above	8	16.0
Mean	48.0600	
Sex		
Female	16	32.0
Male	34	68.0
Marital status		
Married	43	86.0
Single/divorced	2	4.0
Widow	5	10.0
Educational Status		
No school	1	2.0
primary	22	44.0
secondary	14	28.0
Post-Secondary	13	26.0
Estimated monthly income		
≤ 20,000	5	10.0
21,000-30,000	6	12.0
31,000-40,000	9	18.0
41,000-50,000	10	20.0
51,000 and 60 above	5	10.0
61 and above	15	30.0
Mean	54,6000	
Involvement in farming		
Full time farming	20	40.0
Part time farming	30	60'0
Household size (Number)		
1-5	18	36.0
6-10	32	64.0
11 and above	0	0
Mean		

Source: Field survey, 2017

Results showed that most of the respondents (86%) were married while 10% were widowed. These results conformed with Adegboye (2016) who reported that 90% of the sampled respondents in Northern Nigeria were married thus supporting Ozor, Ozioko and Acheampong (2015) that marriage is vital in rural areas where wives usually supported their households in agricultural production, processing and marketing. The results further show that 28% of the respondents had secondary education which that there was relatively high level of literacy among the respondents in the study area which could enhanced their level of production and consumption of protein source. The more educated the respondents are, the better they can adopt innovations more readily that will lead to increased output (Apu and Nwachukwu, 2014).

The result indicated that a greater proportion of the respondents (60%) were farmers This implies that farming was not the major source of income of respondents in the study area. This finding is contrary to the views of Akin-Olagunju and Omonona (2014) who reported that agriculture represents the main income source in the rural economy. The mean household size of the respondents was 6 persons per household. This implies that the respondents in the study area had a fairly large household size. According to Ozor *et al.* (2015), large household size could be a useful source of labour for farming activities. This result is also in conformity with the views of Umeh (2016) who reported that household size is a source of cheap labour for farmers, thereby reducing costs incurred in farming operations. On the other hand, household size affects the level of protein consumption among rural farm household in the study area.

The mean monthly estimated income of the sampled respondents in the study area was N54,600. This result implies that the monthly income of the respondents in the study area is low and might affect the level of consumption of protein source among the rural farm households. The results is similar to the finding of Amanze, Ezeh and Okoronkwo (2015) which indicated a mean monthly estimated income of N67,091.11 among sampled rural farmers in Anambra State.

Major Sources of Animal Protein readily available to Rural Households in the Study Area

Results in Table 2 shows that the major sources of animal protein sources were readily available to the respondents in the study area though at different proportions. Most of the respondents indicated that crayfish (99.3%), milk (98%), fish (96.0%), beef (94%), Chicken (92%) the major source of animal protein commonly consumed in the study area. Other sources include egg (82%), and bush meat (82%). The result implies that a wide range of animal protein sources are commonly available to rural households in the study area. However, result contradict the findings of Adetunji, and Adepoju (2011) who reported that animal protein is fairly available in Oyo state where people spent as much as ₦7,000 monthly to purchase protein meal and consumed protein meal in partial, once daily because of the cost.

Table 2: Distribution of respondents according to major Animal Protein Sources most commonly Consumed by the respondents in the study area

Animal Protein Source		Frequency	%
1	Cow meat	47	94.0
2	Goat/Sheep	30	60.0
3	Pork	11	22.0
4	Fish	48	96.0
5	Crayfish	50	100
6	Egg	41	82.0
7	Milk	49	98.0
8	Chicken	46	92.0
9	Snail	34	68.0
10	Game meat	41	82.0

Source: Field Survey, 2017

Frequency of Consumption of Animal Protein Sources among Rural Farm Households

Table 3 shows the result of frequency of protein source consumption by the rural households in the study area State. The result shows that crayfish ($\bar{x}$ = 6.62), fish ($\bar{x}$ = 5.94) and cow meat ($\bar{x}$ = 5.04) were the frequently consumed animal protein sources by rural households in the study area. Furthermore, the result also revealed that Milk ($\bar{x}$ = 4.62) egg ($\bar{x}$ = 3.33), goat/sheep ($\bar{x}$ = 3.18), snail ($\bar{x}$ = 3.08), chicken ($\bar{x}$ = 2.91) game meat ($\bar{x}$ = 2.90) were occasionally consumed while pig meat ($\bar{x}$ = 2.18) was scarcely consumed by rural households in the study area. The implication of this result is that the respondents in the study area consumed crayfish, fish and cow meat more than other animal protein sources. This implied that crayfish is the most readily available and affordable animal protein source among rural farm households in the area. This is in line with the findings of Ogunniyi (2011), who reported that majority of the respondents in Oyo State consumed staple food that are readily available and affordable irrespective of the nutritional value of the food.

Table 3: Distribution of respondents according to frequency consumption of protein in the study area (N=50)

Foods eaten	Frequency of Consumption							
	Every day (7)	5-6 days/ week (6)	3-4 days/ week (5)	1-2 day/ week (4)	Once in 2 weeks (3)	Only during festivities (2)	Never (1)	Mean Max = 7
Cow meat	8	6	18	16	2	0	0	**5.04**
Goat/Sheep	2	2	2	8	26	1	8	**3.18**
Pork	0	1	5	2	11	0	26	**2.18**
Fish	19	14	13	3	1	0	0	**5.94**
Crayfish	38	8	2	1	1	0	0	**6.62**
Egg	0	1	1	12	33	1	0	**3.33**
Milk	6	3	19	12	9	0	1	**4.62**
Chicken	0	1	1	2	33	11	0	**2.91**
Snail	0	0	4	9	28	7	2	**3.06**
Bushmeat	0	0	1	4	37	3	5	**2.90**

Source: Field Survey, 2017 key: Scarcely consumed = 1- 2.33; Occasionally consumed = 2.34- 4.66; Frequently consumed = 4.67 - 7

Estimates of the Relationship between selected Household's Socio-Cultural Factors and Consumption frequency of Animal Protein Sources

The results of Probit regression estimates of the relationship between selected household's socio-cultural factors and frequency of consumption of animal protein sources in the study area shows the Chi-square value of 2592.98 significant at 1% level of probability. Therefore, the null hypothesis which states that there is no significant relationship between selected households' socio-cultural factors and frequency of consumption of animal protein sources in the study area is hereby rejected, and the study concludes that there is a significant relationship between selected socio-cultural factors and the consumption frequency of animal protein sources in the study area. Specifically, factors such as household size/composition (0.618), knowledge of relevance of protein (0.371), household's choice of meat (0.147) are positively related to frequency of consumption of animal protein sources at 1% significant level. This implies that an increase in households' size and composition, knowledge of relevance of protein as well as variety of meat choice will lead to a corresponding increase in the frequency of consumption of animal protein source. This is expected because household size affects the level of food consumption among rural families (Obeyelu *et al*., 2009). Furthermore, factors such as variety of household meals (-0.177), household educational status (-0.153) were negatively related to frequency of consumption of animal protein sources at 5% and 1% significant levels respectively. This implies that any increase in type of household meals and household educational status will lead to a corresponding decrease in the consumption frequency of animal protein sources.

Therefore, the null hypothesis which states that there is no significant relationship between selected households' socio-cultural factors and frequency of consumption of animal protein sources in the study area is hereby rejected, and the study concludes that there is a significant relationship between selected socio-cultural factors and the consumption frequency of animal protein sources in the study area.

Table 4: Probit Regression estimates of the relationship between selected household's socio-cultural factors and consumption frequency of animal protein sources in the study area

Parameter	**Estimate**	**Std. Error**	**Z**
Intercept	-1.792	.153	-11.743***
Variety of household's Meal	-.177	.045	-3.896***
Household Size and composition	.618	.079	7.785***
Knowledge of relevance of Protein	.371	.066	5.656***
Household's Educational Status	-.153	.073	-2.100**
Household's cultural affiliation	-.076	.093	-.821
Wealth status of the Household	.029	.072	.403
Household's choice of meat	.145	.047	3.086***
Availability of Meat in the house	.052	.057	.904
Chi square (goodness of fit)	2592.984***	.000	
Degree of freedom	37		

Source: Field survey data, 2017

CONCLUSION

The study investigated the frequency of consumption of animal protein sources among rural farm households in Awgu Agricultural Zone of Enugu State, Nigeria. Results show that the mean age of the respondents was 48years old with most of them being males married and well educated; possessing household size of 5 persons/household, partly engaged in farming and earning a mean monthly income of N54,600. The result shows crayfish, fish, cow meat egg, chicken, game meat were the animal protein sources most readily available to the rural households while crayfish, fish, and cow meat were the frequently consumed animal protein sources while pig meat was scarcely consumed by rural households in the study area. Factors such as household size/composition, knowledge of relevance of protein, household's choice of meat were positively related to frequency of consumption of animal protein sources. On the other hand, factors such as variety of household meals, household educational status were negatively related to frequency of consumption of animal protein sources.

This paper therefore concludes that there is a significant relationship between socio-cultural factors and the frequency of consumption of selected animal protein sources in the study area. It is thus recommended that nutritional enlightenment campaign should be mounted in the area to encourage rural households incorporate readily available and affordable animal protein sources especially crayfish and fish, and cow meat in their meals as conscious efforts to boost household protein intake.

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