SURVEY ON FROZEN FISH CONSUMPTION PATTERN AMONG SELECTED HOUSEHOLDS IN OBIO/AKPOR LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

Albert C.O., C. R Tasie

Department of Agricultural and Applied Economics/Extension, Rivers State University of Science and Technology, Nkpolu-Oroworukwo, Port Harcourt

**Corresponding author: carobinedo@yahoo.com*

Abstract. The study focused on frozen fish consumption pattern among selected households in Obio/Akpor Local Government Area (OBALGA). One hundred (100) households were randomly selected from ten (10) communities in the Local Government Area. Questionnaire and interview schedule were used to elicit information from respondents. Data collected were subjected to descriptive statistics such as percentage and mean scores. The result of the findings show that 66% of the respondents are married, 72% are females, they are all literate (100%), 77% had a household size of 4-10, 74% have a monthly income of N10,000-100,000, 66% fell within the age bracket of 30-50years and 72% have a means of livelihood. The main pattern or ways frozen fish was consumed or taken by the respondents in the study area were; dried/roasted (51%) while 33% consume frozen fish when it is cooked fresh. The factors militating against frozen fish consumption in the study area are: bad/unpleasant smell (m= 3.43), poor power supply (m= 2.57), loss of nutrient (m= 3.29), spoilage (m= 3.87), unavailability of preferred specie (m= 2.90), complex preparation (m= 2.66) and exposure to flies (m= 2.53).

Keywords: Ways of consumption, Factors militating against

INTRODUCTION

Agriculture is the economic mainstay for majority of the household in Nigeria (Udoh, 2000). It is a significant sector of the Nigerian economy (Amaza, 2000). The agricultural sector is the engine of growth in virtually all developed economy. It includes, crop production, animal husbandry, fish production, among others. Fish production as an enterprise purposes the capacity to contribute significantly in the agricultural sector (Osagie, 2012).

Fish production is an important source of livelihood among the worlds poor, its consumption have long been known to have nutritional benefits. Fish and Fish products are known worldwide as a cheap source of animal protein, hence its high nutrient content is significant in improving human health. Fish contributes 36.6 gram per day of the net protein utilization in Nigerian homes but it is still below recommended requirement by Worlds Health Organization (WHO) and Food and Agriculture (FAO, 2006; Amao *at al*, 2006.

In Nigeria due to the nutritive value of fish and health related factors like high cholesterol content in animal protein which leads to heart attack and heart failure, there, has been a steady increase in the estimated demand for fish. It was estimated that 36 percent of animal protein consumed by a Nigerian comes from fish. According to (Zango-Daura, 2000) Nigeria requires 1.5 million tonnes of fish annually in order to meet the FAOs recommendation of 35.0g per day which contributes up to 180 kilo calories per person per day by FAO estimation. With soaring population of over 150 million as at 2010 census (Zango-Daura, 2000) opined that the annual per head consumption of fish in

Nigeria was 9.48kg. The shortfall is not because of the non-availability of resources but due to non-maximization and sustainable utilization of aquatic resources (FAO, 2006). As a matter of fact Nigeria is endowed with over 2,658 fish farms, as well as 937 dams and reservoirs, 365 Lakes, 687 ponds and flood plains totaling over 1.3 million hectares of water bodies which still remains untapped (Ibeun, 2006). .

Due to the pollution of rivers and seas of coastal areas in the state resulting from oil activities like drilling and pipeline vandalization, there is a decline in captured fish in the country (Albert and Igbokwe, 2014). The decline in captured fish and aquaculture meeting about 7.6% of the country's current estimated fish demand of 2 million metric tonnes (annual), the shortfall is being addressed by importation of frozen fish. Nigeria imports close to 90 million U.S dollars worth of fish in 2009 Source from Europe, South America, South Pacific Zone and African countries such as Mauritania and Senegal (NFR, 2012). Frozen fish market has been dynamic in recent years. Since the time that Nigerian government made a reduction on all fishery products in 2001 from 25% to 5%. Nigeria has become a major destination for importation of seafood. The total market demand in Nigeria according to industry sources have grown to more than 1 million tonnes bought per annum, making it the largest market in West Africa in the industry (NFR, 2012).

It is also on this premise that this study wants to find answers to the following research question: What are the socioeconomic characteristics of frozen fish consumers? What are the factors that influence household choice for frozen fish? What is the distribution channel of frozen fish in the area? And what is the pattern of frozen fish consumption?

Literature Review

It is well argued that human food consumption behavior is very complex (Olsen, 2004). There are number of factors considered as influential in general food choice as health, mood, convenience, sensory appeal, natural content, price, weight control and familiarity (Verbeke, 2005). In transitional economy for example in Czech Republic, Bulgaria and Rumania, it is found that freshness and price are the most important attribute to food choices.

In explaining food consumption as well as seafood consumption, behavior and attitude are treated as fundamental concept. Olsen, (2004) found four salient beliefs reasonable in forming seafood/food consumption attitudes as: taste, distaste (negative affect), nutrition and quality/freshness. A taste or distaste issue is the most important criteria in forming seafood/food attitude especially among young consumers in contrast with health and nutrition preference of the elder consumers. Seafood/fish is considered the healthier food but at the same time treated as less tasty food in comparison with meat (Olsen, 2004). ; Verbeke, (2005). However, there are several attributes such as unpleasant smell and bones which contribute only negatively in forming food attributes. After taste issue, the nutritional aspect is the second prominent factor that affect consumers food attitude. It is directly related to health and healthy eating behavior (Olsen, 2004). The quality of the fish/seafood freshness is the prime determinant. In this regard frozen fish are treated as noon-fresh, bad quality, tasteless, watery and boring (Olsen, 2001).

Other attributes like price and convenience also have impact on fish consumption attitude formation. However, Olsen (2004) found price, value for money and household income not barriers to seafood consumption, while Verbeke (2005) reported that price negatively affect fish consumption attitude because of complex preparation and cooking procedure, fish is treated as an inconvenient food item (Verbeke *at al*, 2007).

Fish is highly perishable food which needs proper handling and preservation if it is to have a long shelf life and retain a desirable quality and nutritional value (FAO, 2010).

The central concern of fish processing is to prevent fish from deteriorating. The most obvious method of preserving the quality of fish is to "keep them alive", until they are ready for cooking and eating. A release report by FAO (2006) listed out other methods to preserve fish and fish product to include: the control of temperature using ice, refrigeration or freezing; the control of water activity by drying salting, smoking and freeze-drying; the physical control of microbial loads through microwave heating or ionizing irradiation; the chemical control of microbial loads by adding acids; and oxygen deprivation, such as vacuum packing. The principle behind any preservation technique is explicit and it is aimed at preventing fish spoilage, lengthening shelf life by inhibiting the activity of spoilage bacteria and metabolic changes. Fish normally host many bacterial and most of the bacteria on spoiled fish played no role in the spoilage (Hush, 1988).

It has been established that fish begin to spoil immediately after death. This is reflected in gradual development of undesirable flavors, softening of the flesh and eventually substantial loss of fluid containing protein and fats. By lowering the temperature of dead fish, spoilage can be retarded and if the temperature is kept low enough, spoilage can almost be stopped. Activity in the fish from microbial or autolysis processes can be reduced or stopped. This is Ice preserves fish and extends shelf life by lowering the temperature. If temperature is decreased, the metabolic achieved by refrigeration where the temperature is dropped to about 0oc or freezing where the temperature is dropped below-18^{o}c. On fishing vessels, fish is refrigerated mechanically by circulating cold air or by packing the fish in boxes with ice (FAO, 2010). An effective method of preserving the freshness of fish is to chill with ice by distributing ice uniformly around the fish. It is safe cooling methods that keeps the fish moist and in an easily stored form suitable for Transportation. Variety is an important factor in food consumption and consumers try to balance their diet throughout the day and across meal over a time span (Verbeke *at al*, 20007). Before deciding what to have for a meal on a particular day, consumers consider the different dimensions such as convenience, price, brand, nutrient, health etc. the mental cost of making a choice can be exhausting (Hush, 1988). In order to deliver still fresh, these fishes caught in foreign waters are delivered to Nigeria markets in frozen form and about 80% are sold to consumer as frozen and the remaining fractions are either smoked, fried or even cooked and sold to consumers.

MATERIALS AND METHODS

Obio/Akpor Local Government Area (LGA) (OBALGA) is one of the twenty three (23) Local Government Areas in Rivers State. It has it's headquarter suited at Rumuodomaya. It is made up of four (4) clans; the Evo, Apara, Akpor and Rumueme clan which comprises several villages. Multistage sampling technique was employed. First was the purposive sampling of communities around the four major frozen fish deports from the four (4) clans that make up the LGA. Obio is made up of Evo and Apara clans. From the nine (9) communities that constitute Evo kingdom, three communities (Rumuahuolu, Rumuokoro and Rumuodomaya) were selected because of the Rumuokoro frozen fish deport. In Apara (Eneka, Rumupokwu and Rumuigbo) were selected for Rukpoku deport. In Akpor, (Choba, Rumuosi and Alakahia) were selected for Choba deport and in Rumueme (Mgbosimini-Oroazi) was selected. A total of ten (10) communities were selected. Secondly ten (10) households' heads were randomly selected. This is to ensure that households consuming frozen fish were interviewed from each of the selected

community. This gave a total of 100 respondents that were surveyed for the study. Data were collected through primary source which was extracted from personal interview and using structured questionnaire/interview schedule. The data collected were analyzed using descriptive statistics such as mean score.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of respondents in the study area

Table 1 shows that a greater percent (47%) of the respondents in the study area fell in the age range of 30 – 40years and a mean of 33.42 years. This indicates that frozen fish consumers are able bodied, energetic men and women who are in their active stage of working life either as civil/public servants, farmers or self employed (artisans or business owners, traders). Majority (72%) of the respondents are female while 28% are males. This indicates that females dominate the proportion of persons who consume frozen fish. Females are the ones that plan and cook the family meals, so they buy frozen fish depending on the amount of money available to cook the family meal. Also, 66%, of the respondents are married, 15% are singles while 17% are either widow or widower. This implies that majority of the respondents are married and have the responsibilities to provide food and money to meet the needs of the family. The entire family husband, wife and children depend on frozen fish as a source of protein intake in their meals.

From the result in Table 1 a greater number (36%) of the respondent had SSCE/WAEC, followed by the ones that had OND/NCE, HND/B,Sc/B,Ed and First School Leaving Certificate with 29%, 24% and 11%, respectively.. This indicates that the respondents have acquired formal education and are able to read and write. Knowledge on high cholesterol content in animal protein would have made them to shift from animal protein intake to fish protein. This would have attributed to the consumption frozen fish in the study area. Since fish catch from the sea/river was not sufficient for people in the study area which have positively influenced the consumption of frozen fish in the area. Ekine *at al,* (2012) in their study on beef and food consumption pattern, noted education and income level of respondents to positively influence consumption pattern including fish. More than half (56%) of the respondents have a household size ranging between 4-6. The mean household size was 4.91, which indicates a fairly large household size. This must have propelled households to depend on frozen fish as a source of protein intake. Furthermore, Table 1 established that a higher percentage (41%) of the respondents earn between ₦10,000 to N30,000 as their monthly income, 22% earn N31,000 to N50,000 while 11% earn between N71,000 to N100,000 in the study area. This indicates that 63% of the respondent earn between N10, 000 to N50, 000. This implies that the monthly income of the respondents was high. Their income was enough to buy any kind of protein product for their meals. The consumption of frozen fish was a chose or preference for frozen fish and not on income level of respondents. Adeyemi (2005) in this study on food consumption, concluded that consumption is a function of income. Also, entries in table 1 show that a greater number (40%) of the respondent are employed, 28% are not employed while 32% are self-employed. This shows that about 72% of respondent in the study area have a means of livelihood and therefore can afford to buy any kind of protein including frozen fish as a source for their meals.

Table 1

Socio-Economic Characteristics of Respondents

Variables	Frequency	Percentage	Mean
Age (Years)			
18 - 20	4	4.0	
21 – 30	20	20.0	
31 – 40	47	47.0	
41 – 50	19	19.0	
51 – 60	4	4.0	33.42
Above 60	6	6.0	
Sex			
Male	28	28.0	
Female	72	72.0	
Marital status			
Single	15	15.0	
Married	66	66.0	
Divorce /Separated	2	2.0	
Widow/Widower	17	17.0	
Educational level			
No Formal Education	-	-	
FSLC	11	11.0	
SSCE/WAEC	36	36.0	
OND/NCE	29	29.0	
HND/B.Sc /B.Ed	24	24.0	
Household size			
1 – 3	16	16.0	
4 – 6	56	56.0	
7 – 10	21	21.0	4.91
Above 10	7	7.0	
Monthly income			
Less than ₦10000	14	14.0	
10,000 - 30, 0000	41	41.0	
31,000 - 50000	22	22.0	33,775
51,000 – 70000	12	12.0	
71,000 - 100,000	11	11.0	
Employment Status			
Not employed	28	28.0	
Employed	40	40.0	
Self employed	32	32-0	

Source: Field Data, 2014

Pattern of frozen fish consumption

Table 2 shows the consumption pattern of frozen fish of respondent in the study area. It shows that more than half (51%) of the respondents consume frozen fish in the roasted or dried form, 33% consume frozen fish when it is cooked fresh while 16% consume frozen fried fish when it is fried. This indicates that the respondents in the study area prefer consuming frozen fish when it is dried or roasted and cooked fresh. The

respondents preferred it in the dried/roasted form because it preserves frozen fish and delay spoilage.

Table 2

Percentage distribution of ways/pattern of frozen fish consumption

Pattern of frozen fish consumption	Frequency	Percentage
Dried/ Roasted	51	51.0
Cooked fresh	33	33.0
Fried	16	16.0
Total	100	100.0

Source: Field Data, 2014

Factors Militating Against Frozen Fish Consumption

Table 3 shows the factor militating against frozen fish consumption pattern in the study area. Taken a mean score of 2.50, the result of the finding established that bad/unpleasant smell (m = 3.43), poor power supply (m = 2.57), loss of nutrient (m = 3.29), spoilage (m = 3.87), unavailability of preferred specie (m = 2.90), complex preparation (m = 2.66) and explosion to flies (m = 2.53) were the factors militating against frozen fish consumption.

This indicates that bad/unpleasant smell resulting from chemicals used for preservation of frozen fish when it has de-frozen or tore causes the fish to have yellow colour thereby putting away prospecting buyers. Persons who would not be able to prepare frozen fish at the time it was bought would not want to buy it for fear of spoilage as a result of poor power supply. Some fish are seasonal and might not be available for sometimes, unavailability of preferred specie is a militating factor.

The preparation of fish is time consuming especially among households that work all through the week, its complexity makes households sort for other substitute. The exposure of frozen fish to flies affects its consumption rate because flies carry bacteria which make consumers see the consumption of frozen fish as unhealthy.

Table 3

Factors Militating Against Frozen Fish Consumption

Variables	Mean Score	Standard Deviation
Bad/unpleasant smell	3.43*	0.53
Poor power supply	2.57*	0.52
Loss of nutrient	3.29*	0.49
Spoilage	3.87*	0.48
High cost of storage	1.95	0.12
Poor Road Network	1.59	0.21
Very expensive	1.67	0.11
Unavailability of preferred specie	2.90*	0.62
Complex preparation	2.66*	0.63
Sellers stop selling so early	1.52	0.14
The selling environment is too dirty	2.28	0.02
Too exposed to flies	2.53*	0.62

*Militating factors Mean score ≥ 2.50

Source: Field Data, 2014

CONCLUSION

Consumption of frozen depend solely on preference or chose and not on income. Knowledge on reduction of protein with high cholesterol content has resulted to a shift from animal protein to fish protein. Fish catch from the sea was not sufficient for the people in the study area; this has made households to rely on frozen fish. Households prefer to consume frozen fish when it was roasted or dried because they are sure of the state of fish in that form (in terms of spoilage). In order to preserve frozen fish from spoiling, sellers use chemicals to preserve their fish which has propelled prospective buyers of frozen fish. Based on the findings, it was recommended that owners of cold rooms and frozen fish sellers should stop the use of any form of chemicals for fish preservation in the state.

REFERENCES

1. Albert, C.O. & Igbokwe, E.M (2014). Assessment of rural livelihoods in oil producing communities of Rivers State, Nigeria. *Agricultura, Agricultural Practice and Science Journal*, 1-2 (89-90), 103-108.

2. Adeyemi, S. (2005). Introduction to Aquaculture and Fisheries Management in Nigeria: Criteria for selecting cultured species. Good Educational Publisher, Nigeria.

3. Amao, J., Oluwafaya, I.B., and Osuratope, F.K. (2006). Economics by fish demands in Lagos State, *Nigeria.* Journal of Human Ecology, 19(1), 25-30

4. Amaza, P.S. (2000). Resource –use Efficiency in food crop production in Gombe State, Nigeria. An Unpublished Ph.d Thesis in the Department of Agricultural Economics, University of Ibadan

5. Ekine, D.I., Albert, C.O., and Peregba, T.A. (2012). Expenditure pattern for beef consumption in selected households in southern Nigeria. Journal of Developing Country Studies, 2(7), 1-5.

6. Food and Agricultural Organization (FAO) (2006). *The State Of World Fisheries And Aquaculture.* Rome

7. Food and Agricultural Organization. FAO yearbook. Fishery and Aquaculture statistics. FAO fisheries and Aquaculture department (online). Rome; 2007. Available from ftp://ftp.fao.org/docrep/fao/012/i1013t/i1013t.pdf, accessed June 15th 2010.

8. Hush, H.H. (1988). Quality and quality changes in fresh fish. *FAO Fisheries Technical*, Paper 348

9. Ibeun, M.O. (2006). Information for Responsible Fisheries: Libraries as mediators. In: Anderson, K.L and Thiery, (Ed). Proceedings of 31st Annual conference of International Association of Aquatic and Marine Science Libraries and Information Centers, Fort Pierce, Rome

10. Nigeria Fish Report (NFR) (2012). Available from ftp://ftp.nfr.org/doc/fnig/012/i1013t/i1013t.pdf, accessed June 5th 2012.

11. Olsen, S.O.(2001). Consumer Involvement in seafood as family meals in Norway: An application of the expectancy-value approach. Appetite, 36(2). 173-186

12. Olsen, S.O. (2003). Understanding the relationship between age and seafood consumption: The mediating role of attitude, health involvement and convenience. Food Quality and Preference, 14(3), 199-209.

13. Olsen, S.O. (2004). Antecedents of Seafood Consumption Behaviour: An Overview. Journal of Aquatic Food Product Technology, 13(3), 79-91

14. Osagie, C., (2012) Aquaculture as path of thriving Agriculture, 2012. Accessed online 5th October 2012 from http:www.thisdaylive.com/articles/aquaculture-as-path-to-thriving-agriculture//24614

15. Udoh, E.J. (2000). Land Management and Resource-use efficiency among farmers in South-Eastern Nigeria. Unpublished Ph.D thesis in the Department of Agricultural Economics, University of Ibadan

16. Verbeke, W., and Vackier, I. (2005). Individual determinants of fish consumption: application of the theory of planned behaviour. Appetite 44(1), 67-82

17. Verbeke, W., and Vermeir T., Brunso, K. (2007). Consumer evaluation of fish quality as basis for fish market segmentation. Food Quality and Preference, 18(4), 651-661.

18. Zango – Daura, S. (2000). Fish Import gulps #12 Billion yearly. New Nigerian Newspaper