



Analysis of Fish Consumption Pattern among Kogi State University Students, Anyigba, Kogi State, Nigeria

F. O. Oyibo¹, Y. E. Ajibade^{1*}, O. E. Haruna¹ and S. D. Samuel¹

¹*Kogi State University, Anyigba, P.M.B. 1008, Anyigba, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. Author FOO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors YEA and OEH managed the analyses of the study. Author SDS managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAAR/2020/v14i130124

Editor(s):

- (1) Dr. Villagomez Cortes Jose Alfredo Santiago, Professor, University of Veracruz, Mexico.
(2) Dr. Tancredo Souza, Centre for Functional Ecology, University of Coimbra, Portugal.

Reviewers:

- (1) Sara Bonanomi, Institute of Marine Biological Resources and Biotechnologies (IRBIM), Italy.
(2) Vishnu K. Venugopal, Central Institute of Fisheries Technology, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/54281>

Original Research Article

Received 02 December 2019

Accepted 06 February 2020

Published 11 August 2020

ABSTRACT

This study analyzed the pattern of fish consumption among Kogi State University students in Anyigba. It described the socio-economic characteristics of respondents, determine the effects of socio-economic characteristics on fish consumption, describe the types, forms, reasons for fish consumption and identify the constraints affecting fish consumption among the respondents. Multi-stage random sampling technique was used to select a sample size of 150 respondents. Well structured questionnaire coupled with interview scheduled were used to elicit primary data from the respondents. Descriptive statistics, binary logit regression and 3- point likert scale were used for data analyzing. The results showed that majority (60%) of the respondents were female, 72% were unmarried with an average household size of 3 persons and average income of N 20, 000 per month. Their sources of income were from parents and guardians. The result of the binary logit regression indicated that age (-1.21), income (0.99), price (-0.19), taste (0.65), health benefit (2.31) and price of substitute (0.68) influenced the consumption of fish at 1%, 5% and 10% level of significant respectively. The types of fish consumed were majorly mackerel fish (45.33%),

*Corresponding author: Email: euniyetbade@yahoo.com;

followed by tuna (27.34%). Iced fish were mostly (40%) consumed, followed by 20.67% steamed fish and 7.33% were consumed in grilled form. 43.33% consumed fish for health benefits, 24% consumed fish due to affordability and 14% consumed fish due to availability. Among the constraints facing fish consumption were allergy, proximity, storage and cost with mean score of 2.37, 2.16, 2.10, 2.36 and 2.38 respectively. Thus, fish and fish products were mostly consumed by the respondents with high consumption rate recorded by the female students. The prices of fish should be stabilized, adequate cold storage facilities should be purchased by the fish mongers and the university Fishery department should expand their ponds for efficient production.

Keywords: Fish; consumption; pattern; Kogi; university; students.

1. INTRODUCTION

Responsible fish consumption should be emphasised worldwide. According to Ladu [1], it is an important component of human diet, with high nutritive value and significant in human health improvement. It is one of the majorly consumed animal proteins which are responsible for both human and animal development [2]. It supplies essential nutrients to the body in form of protein, lipids, vitamins and minerals [3]. It also converts food efficiently into humans and saves children from Kwashiorkor and there is little or no religious restriction on its consumption [2]. According to Akinbode and Dipeolu [4], it is relatively cheaper and readily available to the poor people in most developing countries of the world including Nigeria. Thus, fish consumption can bridge the gap existing in the protein intake or protein requirement for both human and animals (Adeniyi) [5].

Rural area households that are far from riverine regions were found to expend more on fish and fish products than other animal products such as beef, pork and goat [6]. Federal Department of Fisheries (2009) revealed that about 50% of the total animal protein intake is from fish, because it's the cheapest source of animal protein and contributes immensely to the economy by employing a good percentage of the active labour force in the agricultural sector. Nigeria with extensive mangrove ecosystem should be able to achieve sufficient and sustainable fish output to meet domestic demand FAO (2005). FAO (2006) stated that Nigeria has over 14 million hectares of inland water surface out of which 1.7 million are available and sustainable for aquaculture.

Whelton, et al. [7] opined that fish consumption leads to reduction in risk of heart diseases because it contains high concentration of Omega-3 fatty acid which has a resultant effect of reducing inflammation, heart failure, strokes

and heart diseases. Anita, et al. [8] observed that increased consumption of fish improved the quality of sleep for most subjects because of the high concentration of vitamin D, hence, it aid proper relaxation of the body. Heston [9] showed that vitamin D and omega-3 fatty acids, which are heavily prominent in most fatty fish, play a big role in post-exercise muscle regeneration and fatigue recovery.

According to Dauda, et al. [10], fish consumption in Nigeria is only high in the southern part of the country but very low in the northern part. This is due to uneven distribution of fish as a result of uneven rainfall pattern, high cost of transportation, preservation, taxation among others. Fish supplied in Nigeria is either through capture fisheries, fish farming or by importation [11]. However, the annual dietary requirement for Nigerian citizens (over 160 million) per annum is about 2.66 million MT of fish, although a larger percentage of fishes consumed within the country are imported [12].

Thus, fish consumption is essential to the well being of everyone in the country with its high level of protein content (FAO), [13]. Medically, fish consumption is advocated especially for children within age bracket of (1-14 years) and aging adults within the range of 40 years and above [2]. Health reasons constitute to the reasons individual consumers eat fish. Also, FAO [14] revealed that omega-3 fatty acid enhance consumers well being, improve the quality of health and provide environment that permits build up of anti-bodies of consumers. Thus, this study mainly analysed, the pattern of fish consumption among Kogi State University students in Anyigba and specifically, described the socio-economic characteristics of respondents, determine the effects of socioeconomic characteristics on fish consumption, describe the types, forms, reasons for fish consumption and identify the constraints

affecting fish consumption among students in the area.

In spite of the growing interest shown by the government and the private sector of Nigeria economy, the gap between the demand of fish in Nigeria (1.3 million metric tonnes annually) and the supply of fish from domestic production (0.45 million metric tons annually) has continue to widen [2].

The Theory of Planned Behaviour is one of the most commonly used theory as it is used to explain the variance in behaviour [15] (Scholderer and Grunert, 2001), [16]. Noting that fish represents an important source of protein and other nutrients [17,18], it is also necessary to understand the principal factors driving Nigerian fish consumer behaviours. These principal factors was expounded in the study of Lennernäs, et al. [19] which highlights the roles of quality, freshness, price, taste, healthy choices and family preferences, while Drewnowski & Darmon [20] consider the effects of taste, convenience and economic constraints on food choices [21]. Many different models, which take different and often interrelated factors into account, have been proposed to explain consumer behavior towards fish [22]. From Ajzen's [23] perspective, it may be deduced that "the intention to adopt a certain course of action logically precedes actual performance of the behaviour". Ajzen [24] and Bruwer and Mosack [25] in their respective study added that intentions may be determined not only by attitudes, norms and perceived control but also by one or more added variables, and these added variables were captured, at least in part, by measures of past behaviour [22] and health [26].

Global food fish supply and consumption has also been growing at a rate of 3.6% per year since 1961, while the world's population has been expanding at 1.8% for the same period [2]. The protein derived from fish, crustaceans and mollusks accounts for between 13.8% and 16.5% of the animal protein intake of the human population. The average apparent per capita consumption increased from about 9kg per year in the early 1960's to 16kg in 1977. The per capita availability of fish and fish product have nearly doubled in 40 years outpacing population growth (WHO, 2011).

Babalola [27] in his study on effect of income on food consumption expenditure in Ado-Ekiti, expounded that coefficients for the complete

elasticity on all foods and the expenditure on starchy foods had a positive relationship with household size. Hence, there is a direct relationship existing between income and consumption of fish by both households and individuals. Davies [28], revealed the inter-relationship between socio-economic characteristics of food expenditure pattern and nutritional status of low income households. Umoh [29], also in his study on household food consumption and income distribution pattern in Nigeria found that the level of education positively influenced expenditure on food items (fish inclusive).

Ighoro [30] study on household consumption pattern of animal products in south-western part of Nigeria realized that the average monthly expenditure on fish was 34.885%, mutton, chicken, pork, turkey and bush meat accounted for 4.3%, 5.23%, 4.6%, 4.13% and 3.4% respectively. Fish was reported to have the highest frequency of animal protein consumed by households [31].

Akeson-Samson [32] reported that fish is the single most important animal protein consume in almost all African countries. However, he concluded by saying consumers usually have a natural preference for specific fish species while acceptability could be influenced by taste, price and income of consumers. Adeyemi [33] in his own study concluded that consumption of fish is a function of income.

Adeosun [34] revealed that 70% of animal protein consumed by Nigerians come from fish and he attributed the high demand for fish consumption to improved standards in income levels, increased population and better health awareness together with affordability [35]. Also, the variations in meat and fish consumption since 1960 are tied to economic factors such as relative prices, expenditure and those factors which may be attributed to a shift in consumer preferences [36].

Oniye and Adeboye [37] in their study on consumers' preference for fish in Kaduna State observed that fresh fish was most preferred for consumption by people of all groups in the state, followed by fried, smoked and dried fish. Also, income level was found to be a major factor influencing household fish consumption decision. Other determinants of fish consumption include the various species of fish sold in the markets, as well as, the different forms in which these fishes are bought Mabawonku, et al. [38].

2. METHODOLOGY

The study area is Kogi State University, Anyigba. It is situated in the north central region of Nigeria (Latitude 7°29' E and Longitude 7°11' N). It was established in the year 1999 by Late Prince Abubakar Audu. The institution was named Prince Abubakar Audu University (PAAU) in the year 2002 after the founder and later renamed Kogi State University (KSU) in 2003. It started with student population of 700 in year 2000, grew into 16,000 in 2009/2010 academic session and became 23,692 in 2016/2017 session. The university also have centre for pre-degree and diploma studies established by the management of the institution [39]. The population of the study was all students of Kogi State University Anyigba, with a present number of approximately 23, 692 as obtained by the Academic planning office of the institution (Academic planning, 2016).

Some students live in the hostels within the university premises, while other live off the campus and are responsible for their feeding in both cases. These are provided by their parents in physical or financial forms.

Multi-stage random sampling technique was used for this study. The first stage involved the random selection of five faculties, followed by random selection of three departments from each of the selected faculties and random selection of ten respondents from each department across the various levels making a total of 150 respondents. Primary data were used for the study and these were collected using a well structured questionnaire coupled with interview scheduled. Descriptive and inferential statistics were used for data analyzing. Descriptive analysis captured objectives 1 and 3. Binary Logit regression captured objective 2 while mean score of 3 point likert scale captured objective 4.

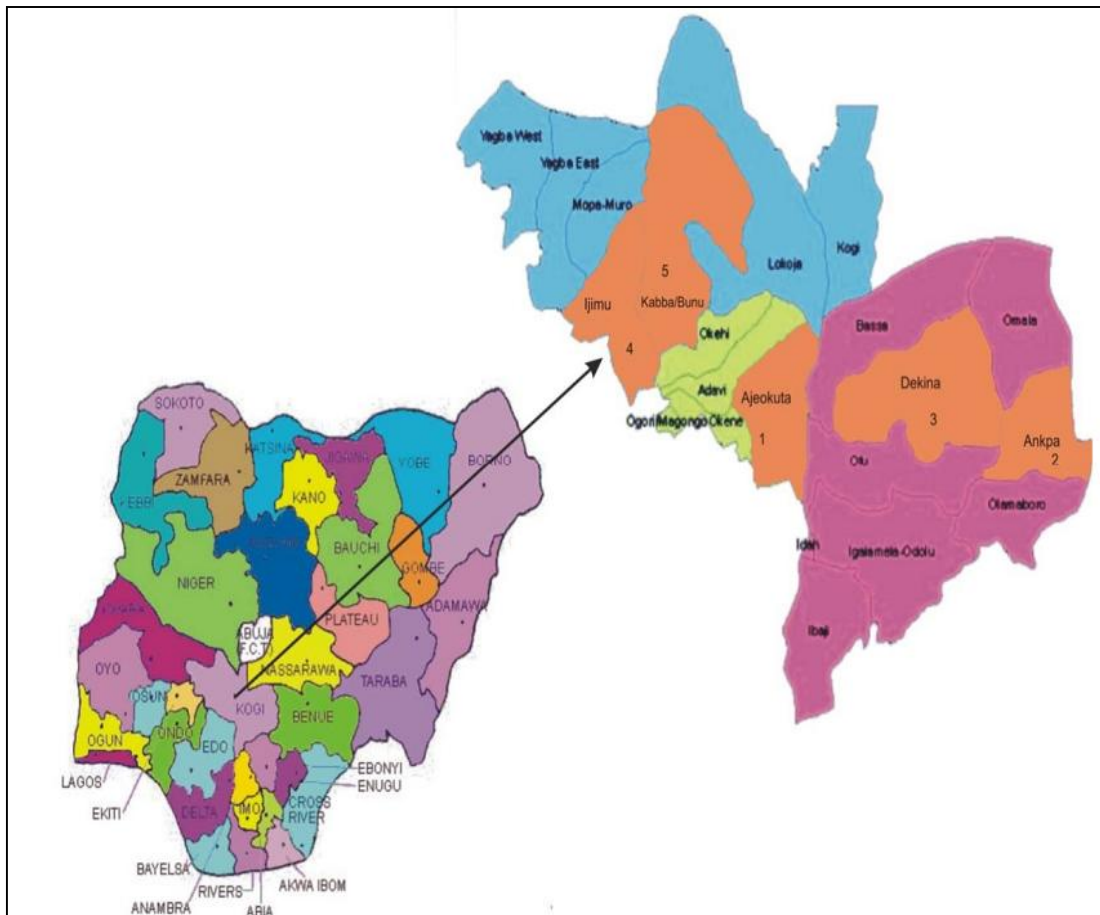


Fig. 1. Map of Nigeria showing Kogi State (enlarged)

Source: GIS Lab Kogi State University, 2010

2.1 Model Specification

The binary Logit regression model is stated as:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9$$

$$\ln\left(\frac{p}{1-p}\right) = \text{Fish consumption (Yes/No)}$$

X₁= gender (Male/Female)

X₂ = age (Years)

X₃= Marital status (Unmarried/Married)

X₄= household size (Number)

X₅ = taste (Yes/No)

X₆ = Preference (Yes/No)

X₇ = Allergy (Yes/No)

X₈ = health status (Yes/No)

X₉ = Price (Yes/No)

β₀ = intercept

β₁β₂, β₃, β₄, β₅, β₆, β₇, β₈, β₉= slopes of each explanatory variables

Formula for Mean Score as developed by Renscaleis Likert in 1930s

$$\bar{X} = \frac{\sum Fx}{N}$$

Where

X = mean response

F = number of responses choosing a particular scale point

X = numerical value of scale point

N = total number of respondents

The three point likert scale used was:

Very serious (VS) = 3, Serious (S) = 2, Not Serious (NS) = 1

The mean score to each item was interpreted using the concept of each limit numbers. The numerical value of the scale point and respective limits are as follows:

Not serious (NS) = 1 point with real limit of 0.5 – 0.99

Serious (S) = 2 points with real limit of 1.5 – 1.99

Very Serious (VS) = 3 points with real limit of 2.5 – 2.99

Decision rule: Since it a 3- point Likert type therefore $\frac{3+2+1}{3} = \frac{6}{2} = 2$, implying that any problem with mean score of 2.0 and above is a major problem that was considered serious while below 2.0 was considered not serious problem.

3. RESULTS AND DISCUSSION

Table 1 showed that 60% of the respondents were female while 40% were males, indicating that fish consumption was more pronounced amidst female students than their male counterparts in the institution. This could be attributed to the fact that girls prefer fish to other food type as pointed out by Oniye and Adeboye [37]. Also, 31.33% of the respondents fell within 16 – 20 years of age, 63.33% were within 21 – 30 years, 3.33% were within 31–40 years and 2.01% were above 40 years with a mean age of 24 years. This could be as a result of early admission of young people into the higher institution in line with the 6-3-3-4 system of education.

The study revealed 28% of the respondents were married while 72% were unmarried. This implies that fish consumption in the study area is more pronounced amidst the unmarried which could be attributed to the reduced expenses tied to the unmarried as compared to the married students.

Findings of the study revealed that 50.67% of the respondents received less than ₦ 5, 000 – ₦ 20, 000 as their monthly income, 21.33% were found to earn between ₦20,000 – ₦ 60,000, 12.67% earned ₦61,000 – ₦ 100,000, 10% ₦101,000 – ₦ 160,000, 4.67% earned ₦161,000 – ₦ 200,000 and 0.66% had above ₦ 200,000 as monthly income. The mean being ₦ 20,000, implying that the average student who earn < ₦ 20,000 monthly will not be buoyant enough to consume fish in spite of it tremendous protein constituents. This concurs with Adeosun [34] reported that 70% of animal protein consumed by Nigerians comes from fish and he attributed the high demand and consumption of fish to improved standards in income levels.

From the findings, 75.3% of the respondents had 1-5 persons in a household, 22% had 6–10 persons and 2.7% were found to have >10 persons as household size. The mean household size was found to be 3 persons. This confirms to Babalola [27], who reported that coefficients for the complete elasticity on all foods and the expenditure on starchy foods had a positive relationship with household size, but in the case

of expenditure on protein foods, household size was negatively correlated with it.

The study also showed that 6.67% of the respondents have their source of income from trading, 10% from farming, 7.33% were civil servant, and 32.67% were into craft while 43.33% got money from their parents and guardians. By implication, the bulk of the respondents earn money from their parents in form of pocket money, gifts and monthly allowance. Since, many of them were dependants.

3.1 Effects of Socio-economic Characteristics on Fish Consumption

Table 2 shows the effect of socioeconomic characteristics on fish consumption among students of Kogi State University. It was discovered that male compared to female are less likely to consume fish of any type or form. By implication, females are more likely to consume fish in the study area when compared to males. This is because of the seeming increase in the population of female as against that of male.

The study showed that age with a coefficient of -1.21 has a negative significance on fish consumption at 10% level of significance. This implies that every unit increase in the value of age will cause an effect of -1.21 units in the consumption of fish for students. In other words as age increases for consumers, fish consumption tends to decrease by 1.21 units. This could be as a result of health factors, sudden repelling smells or even the development of allergy to Fish smell or Fish bone associated with increased age. Consistent with the findings of Atin, et al. [40] and Isamah [41] who reported that an increase in the desire for consuming Fish is significantly associated with younger age, the price of the Fish, and the health benefits.

From Table 2, income with a coefficient of 0.99 has a positive significance on the consumption of fish at 5% implying that every unit increase in the income level of respondents in the study area will result to a higher consumption level of 0.99 units. This is consistent with the economic theory of demand that shows a positive relationship existing between the income level of respondents and consumption. This justifies the reason students consume more fish within the first one

Table 1. Distribution according to socio-economic characteristics of KSU students

Variables		Frequency	Percentage	Mean
Gender	Male	60	40.00	
	Female	90	60.00	
	Total	150	100.00	
Age	16-20	47	31.33	
	21-30	95	63.33	24 year
	31-40	5	3.33	
	Above 40	3	2.01	
	Total	150	100.00	
Marital Status	Married	42	28.00	
	Unmarried	108	72.00	Unmarried
Monthly Income(₦)	5000 - 20,000	76	50.67	
	21,000- 60,000	32	21.33	₦20,000
	61,000-100,000	19	12.67	
	101,000-160,000	15	10.00	
	161,000-200,000	1	0.66	
	Total	150	100.00	
Household Size	1-5	113	75.3	3 person
	6-10	33	22.0	
	Total	150	100.00	
Source of Income	Trading	10	6.67	
	Farming	15	10.00	
	Civil service	11	7.33	
	Hand work	49	22.67	
	Parents/Guardian	65	43.33	
	Total	150	100.00	

Source: Field Survey, 2018

month of resumption. This is in line with the findings of Mehmet, et al. [42] where he stated that the monthly income of respondents positively influence the consumption of fish and other fish products.

The result from the findings showed that price of Fish has a coefficient of -0.19. This implies that every unit increase in price of Fish will cause a direct effect of -0.19 units in the consumption of Fish for consumers. In other words as price of Fish increases for students; Fish consumption tends to decrease by 0.19 units. From the basic economic theory of demand, we can say the higher the price of a commodity, the lesser the quantity demanded. Hence, the students in the study area are less likely to consume Fish due to the price. To further buttress this, Atin, et al. [40] reported an increase in the desire for consuming Fish is significantly associated with the price of the Fish.

Taste of Fish has a coefficient of 1.31 showing a positive relationship on consumption at 10% level of significance, implying that every unit increase in the value of taste will lead to an increase of 1.31 units in Fish consumption. This could be responsible for the reasons why people go to sophisticated locations in form of eateries, joints, and bars among others to enjoy more palatable taste of Fish in desired forms. To further support this, Can, et al. [17] investigated the factors influencing purchase decision of sea food and reported taste, religion, household size and age of family members to be significant factors at 95% confidence interval.

Health benefit of respondents with coefficient of 2.31 is positively significant at 1% level of significance implying that those students that eat Fish in the study area do so because of their health as well as the health benefits attach to Fish consumption when compared to those that eat it for other reasons. This is in conformity with the observation of Honkanen, Olsen and Verplanken [43]. Health challenges that militate against the consumption of beef or other source of ruminant animal protein thus necessitating Fish consumption which is highly pronounced in tropical regions of the world. This is in line with the findings of Whelton, et al. [7] where he stated that consuming Fish reduces inflammation, heart failure, strokes and heart disease hence the awareness of this health benefits will in turn cause students to consume Fish. Also, Atin, et al. [40] reported that an increase in the desire for consuming Fish is significantly associated with

younger age, the price of the Fish, the health benefits of Fish, concern over the health of meat.

Price of substitute with a coefficient of 0.68 has positive significance on the consumption of Fish at 10% level of significance. Implying, the higher the price of Fish substitute like beef, mutton and chicken among others, the higher the consumption of Fish. Ibeziako [44] reported that With respect to the price of Fish substitute, the value found shows that Fish substitutes are majorly price inelastic since the price elasticity of demand for Fish substitutes is less than one. A proportionate increase in price of Fish will increase consumption expenditure of Fish by 12%. He also added for Fish substitutes, a proportionate increase in the price of substitutes will cause an increase in Fish consumption expenditure by about 3 units.

3.2 Distribution of the Respondents Based on Types, Forms of Fish Consumed and Reasons for Consumption

Table 3 shows that 6% of the respondents consumed tilapia fish, 7.33% consumed cat fish, 45.33% consumed mackerel (titus), 14% consumed cray fish and 27.34% consumed tuna (kote) dominantly. These imply that mackerel, tuna and cray fish are the commonly consumed types of fish in the study area. This could be due to low prices attributed to mackerel, tuna and cray fish as compared with other types. Accessibility of these types of fish in terms of quantity and at desirable places could be another factor. Cray fish appears to be an easy and cheap protein source for students who cannot afford the cost of buying other types of fish and also for students who used it in form of condiment to aid palatability of their meal due to its taste. Marketers have reduced the price of cray fish to as low as fifty naira (₦50).

The study showed that 13.33% of the population consumed smoked fish, 18.67% fried fish, 7.33% grilled fish, 20.67% steamed fish and 40% iced fish. Iced fish is consumed mostly by the respondents in the study followed by steamed fish. This may be as a result of several joints, bars and eateries situated in the institution environment and patronized heavily by students especially in the hours of evening due to their storage facilities.

The study showed that 18.67% of the respondents consumed fish because of the special preference they have for fish compared to other meat, 43.33% consumed fish for health benefit, 24% consumed fish for price affordability compared to other protein source and 14% consumed fish for availability sake. This implies that a large percentage of the population in the study area consumed fish because of the health

benefits derived from it which could be realized from learning institutions, medias or even health institutions. This is consistent with the findings of Whelton, et al. [7], Anita, et al. [8] Robert [45], Esteve, et al. [46] and Heston, [9] while preference, availability and affordability are considered as other reasons that will necessitate the consumption of fish among the respondents.

Table 2. Determinants of fish consumption

Variable	Coefficient	Standard error	P> z
Gender	-1.812572	.615994	0.779
Age	-1.20745	-.120745	0.056
Income	.9945166	.8597886	0.025
Price	-.1857845	.1073535	0.084
Taste	1.311	.6453321	0.042
Preference	.6386266	.6386796	0.317
Average	-1.428332	.9723072	0.142
Wealth Benefit	2.311117	.7620507	0.002
Price of substitute	.6762844	.6402481	0.091
Constant	3.413747	1.669077	0,041

Source: Field survey, 2018

Table 3. Distribution of respondents according to the types, forms of fish consumed and reasons for consumption

Item	Frequency	Percentage
Type of the consumed		
Tilapia	9	6.00
Catfish	11	7.33
Mackerel	68	45.33
Cray fish	21	14.00
	41	27.34
	128.00	100.00
Form of Fish		
Smoked	20	13.33
Fried	28	18.67
Grilled	11	7.33
Steamed	31	20.67
Ice fish	60	40.00
	128.00	100.00
Reasons for consumption		
Preference	28	18.67
Health benefit	65	43.33
Affordability	36	24.00
Availability	21	14.00
	128.00	100.00

Source: field Survey, 2018

Table 4. Constraints to fish consumption

Constraints	Very serious (3)	Serious (2)	Not serious (1)	Total	mean score	Remark
Allergy	102	41	7	356	2.37	Serious
Proximity	43	88	19	324	2.16	Serious
Supply	40	85	25	315	2.10	Serious
Storage	61	82	7	354	2.36	Serious
Demand	14	79	57	257	1.71	Serious
Cost	79	49	22	357	2.38	Serious
Ignorance	42	34	74	268	1.79	Serious

Source: Field Survey, 2018

3.3 Constraints to Fish consumption among students in Kogi State University

Table 4 shows the mean score of the Likert rating of the constraint to fish consumption among the respondents. The respondents in the study area agreed that the constraints identified were serious with mean scores of 2.37, 2.16, 2.10, 2.38 and 2.21 except for demand and ignorance with a mean score of 1.71 and 1.79 respectively. This implies that allergy with mean score of 2.37 is a conspicuous factor constraining respondents from consuming fish in the study area. This could be allergy associated with the smell of the fish while it is fresh, boiled and its taste. This is consistent with Olsen [47] report that state that allergy to fish alongside the unpleasant properties of some fish varieties like bones and smell will constraint an individual from consuming fish.

Proximity to market place and supply with mean score of 2.16 and 2.10 respectively were considered as serious problems in the study area. These could be due to long distance between the respondents' houses and market places where fish are sold and limited supply where markets location are closer. Storage with mean score value of 2.36 was found to pose a serious problem, denoting that storage of fish has contributed to the factors constraining Fish consumption among the populace in the study area. Storage of fish by marketers as well as inability to preserve the essential nutrients that would have necessitated fish consumption on the path of consumer may be due to the unavailability of storage facilities like cool rooms, refrigerators and other forms of preservation enhancing machines, coupled with the unstable power supply. This agrees with Eze, et al. [48] where he reported inadequate processing skill, produce deterioration and lack of storage facilities as constraint to Fish consumption.

Cost was realized to be a serious problem in the study area with a mean score value of 2.38 implying that students are constraint by the seeming increase in the cost of purchasing the fish. This resulted into consumption of other alternatives when they can't afford to buy the desired type of fish. This concur with the study of Eze, et al. [48] in which cost of production, inconsistency in prices of fish, unavailability of fish and high cost of purchase caused reduction in the affordability of fish.

4. CONCLUSION AND RECOMMENDATIONS

In conclusion, fish and fish products were greatly consumed among Kogi State University students who were mostly young female, unmarried, with average monthly income of ₦ 20, 000. They consume mackerel fish majorly in iced form for its health benefits, availability and affordability. Income, prices, taste and preference significantly influence fish consumption in the area.

Based on these findings the study recommends that fish prices should be stabilized, adequate cold storage facilities should be purchased by the fish mongers and the university Fishery department should expand their ponds and be encouraged to produce more fresh and cold fish at affordable prices for students of the university.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Ladu BMB. Special report of National Institute for Fresh Water Fisheries Research (NIFFR). Nigeria Agricultural Managing. 2001;5(1).

2. FAO, IFAD, UNICEF, WFP, WHO. The State of Food Security and Nutrition in the World 2017 – building resilience for peace and food security. Rome, FAO; 2017.
3. Tsado JH, Adeniji OB, Ojo MA, Adebayo CO, Abdulazzeez R. Perception of women knowledge on the nutritive value of Fish in kaduna north local government area of kaduna state, Nigeria. *Journal of Agriculture and Social Research*. 2012; 12(1):162-169.
4. Akinbode SO, Dipeolu AO. Double- hurdle model of fresh fish consumption among Urban households in South-West Nigeria. *Current Research Journal of Social Sciences*. 2012;4(6):431-439.
5. Adeniyi JP. Fish consumption in Nigeria: Implications for fisheries development policies. *Journal of West African Fisheries*. 2003(2):151-161.
6. NBS. Consumption pattern in Nigeria 2009/2010. National Bureau of Statistics. Preliminary Report. 2012;71.
7. Whelton SP, et al. Meta-analysis of observational studies on Fish intake and coronary heart disease. *Am J Cardiol*. 2014; 93(9):1119-23.
8. Anita L Hansen, Lisbeth Dahl, Gina Olson BS, David Thornton, Ingvild E Graff, Livar Frøyland, Julian F Thayer, Staale Pallesen. Fish consumption, sleep, daily functioning, and heart rate variability. *J Clin Sleep Med*. 2014; 10(5):567–575.
9. Heaton LE. *Sports Med*. Selected in-season nutritional strategies to enhance recovery for team sport athletes: A practical Overview; 2007. Available: <https://www.ncbi.nlm.nih.gov/pubmed/28702900>
10. Dauda AB, Yakubu SO. Fish consumption pattern and knowledge of Fish farming among inhabitants of Dutsin-Ma LGA, Katsina State. *Niger. J. Fish*. 2013;10: 586-594.
11. Anene A, Ezech CI, Oputa CO. Resources use and efficiency of artisanal Fishing in Oguta, Imo State, Nigeria. *J. Dev. Agric. Econ*. 2010;2:94-99.
12. Atanda AN. Fish species diversification in agriculture for the success of the agriculture transformation agenda. The Role of Tilapia Production; FISON Annual Public Lecture. 2012;21.
13. Brouwer AM, Mosack KE. Expanding the theory of planned behaviour to predict healthy eating behaviours: Exploring a healthy eater identity. *Nutrition & Food Science*. 2015;45(1):39-53. Available: <http://dx.doi.org/10.1108/NFS-06-2014-0055>
14. FAO. Food Balance Sheets; 2018. Available: www.fao.org/faostat/en/#data/FBS
15. Verbeke W, Vackier I. Individual determinants of fish consumption: Application of the theory of planned behaviour. *Appetite*. 2005;44(1):67-82. PMID:15604034 Available: <http://dx.doi.org/10.1016/j.appet.2004.08.006>
16. Ajzen I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*. 1991;50(2):179-211. Available: [http://dx.doi.org/10.1016/0749-5978\(91\)90020-T](http://dx.doi.org/10.1016/0749-5978(91)90020-T) . 13
17. Can MF, Günlü A, Can HY. Fish consumption preferences and factors influencing it. *Food Science and Technology (Campinas)*. 2015;35(2): 339-346.
18. McManus A, Hunt W, Storey J, McManus J, Hilhorst S. Perceptions and preference for fresh seafood in an Australian context. *International Journal of Consumer Studies*. 2014;38(2):146-152.
19. Lennernäs M, Fjellström C, Becker W, Giachetti I, Schmitt A, Winter AM, Kearney M. Influences on food choice perceived to be important by nationally-representative samples of adults in the European Union. *European Journal of Clinical Nutrition*. 1997;51(Suppl 2):51. PMID:9222718
20. Drewnowski A, Darmon N. Food choices and diet costs: An economic analysis. *The Journal of Nutrition*. 2005;135(4):900-904. PMID:15795456
21. O'Neill V, Hess S, Campbell D. A question of taste: Recognising the role of latent preferences and attitudes in analysing food choices. *Food Quality and Preference*. 2014;32:299-310.
22. Mitterer-Daltoé ML, Carrillo E, Queiroz MI, Fiszman S, Varela P. Structural equation modelling and word association as tools for a better understanding flow fish consumption. *Food Research International*. 2013;52(1):56-63. Available: <http://dx.doi.org/10.1016/j.foodres.2013.02.048>

23. Ajzen I. Consumer attitudes and behaviour. In Haugtvedt CP, Herr PM, Kardes FR. (Eds.), Handbook of consumer psychology New York: Psychology Press. 2008;525-548.
24. Ajzen I. The theory of planned behaviour: Reactions and reflections. *Psychology & Health*. 2011;26(9):1113-1127. PMID:21929476
Available:<http://dx.doi.org/10.1080/08870446.2011.613995>
25. FAO. Aquaculture production (1984-1986). Fisheries and its Importance in Green Revolution Programme. Proceedings of the Annual Conference of Fishery Society of Nigeria. 1989;2:91-96.
26. Tudoran A, Olsen SO, Dopico DC. The effect of health benefit information on consumers health value, attitudes and intentions. *Appetite*. 2009;52(3):568-579. PMID:19501752
Available:<http://dx.doi.org/10.1016/j.appet.2009.01.009>
27. Babalola. Effect of income on food consumption expenditure in Ado Ekiti. An Unpublished B.Sc. Project, Dept. of Agric. Econs. University of Ibadan; 2002.
28. Davies CG. Linkages between socio-economic characteristics of food expenditure patterns and nutritional status of low-income households: A critical review. *American Journal of Agric. Econs*. 2001;64(5).
29. Umoh GS. Household food consumption and income distribution pattern in Nigeria: A case study of Uyo Metropolis. Unpublished M.Sc. Thesis, Dept. of Agric. Econs, University of Ibadan, Ibadan; 1994.
30. Ighoro GS. Household food consumption and income distribution pattern in Nigeria: A case study of Uyo Metropolis Unpublished M. Sc. Thesis Department of Agric Economics, University of Agriculture, Abeokuta; 2002.
31. FDF. Nigeria national aquaculture strategy. FAO. Formally Approved by Government. 2009;18.
32. Akesan-Samson. Introduction to aquaculture and fisheries management in Nigeria Published by Goad Educational Publisher. 2005;76.
33. Adeyemi S. Introduction to aquaculture and fisheries management in Nigeria: Criteria for selecting cultured species. Published by Goad Educational Publisher. 2005;22-23.
34. Adeosun IO. Consumption pattern of Fish among households in Offa, Kwara State. M.Sc. Thesis, Department of Agric. Economics, Obafemi Awolowo University Ile-Ife; 2006.
35. Adeniyi OR, Alabi OA, Ademosun AA. Market prices and proximate composition of four common sources of animal protein in South-Western Nigeria. *International Journal of Current Research*. 2010;9:062-064.
Available:<http://www.journalcra.com> (Accessed February 9, 2011)
36. Popkin BM. Nutrition in transition: The changing global nutrition challenge. *Asian Pacific Journal of Clinical Nutrition*. 2001; 10(Suppl):S13-S18.
37. Oniye SJ, Adegboye JD. Consumption preferences for fish in Kaduna State of Nigeria. Paper presented at the 1986 Annual Conference of the Agricultural Society of Nigeria, ABU Zaria; 2000.
38. Mabawonku AF, Olayemi JK, Ogunfowora O. Consumer attitude to processed fish and fish products in Nigeria. Technical Report AFR No, 32. 2001;1.
39. Ajayi Ademola P. Factors influencing crime and crime behaviours among students of Kogi state University Anyigba; 2017.
40. Atin Surpartini, Taro Oishi, Nobuyuki Yagi. Changes in fish consumption desire and its factors; A comparison between the United Kingdom and Singapore; 2018.
41. Isamah C. The effect on some socio-economic variables on household food consumption expenditure pattern in Ibadan Metropolis. Unpublished M.Sc. Thesis, Dept. of Agric. Econs. University of Ibadan, Ibadan; 1992.
42. Mehmet Ferit Can, Aytakin Gunlu, Hayriye Yesim Can. Fish Consumption preferences and Factors influencing it; 2013.
Available:<https://dx.doi.org/10.1590/1678-457X6624>
43. Honkanen P, Olsen SO, Verplanken B. Intention to consume seafood—The importance of habit. *Appetite*. 2005;45(2): 161-168.
44. Ibeziako SC. Economic analysis of Fish consumption in Ibadan: Implications for food and nutrition policies; 2017.

45. Robert L Rosenthal. Effectiveness of altering serum cholesterol levels without drugs. 2000;13(4):351-355. Journal of Aquatic Food Product Technology. 2004;13(3):79-91. Available:http://dx.doi.org/10.1300/J030v13n03_08
46. Esteve Fernandez, Liliane Chatenoud, Carlo La Vecchia, Eva Negri, Silvia Franceschi. Fish consumption and cancer risk. The American Journal of Clinical Nutrition. 2018;70(1): 85–90. Available:https://doi.org/10.1093/ajcn/70.1.85
47. Olsen SO. Antecedents of seafood consumption behavior: An overview. 48. Eze SO, Ezeh AN, Onwubuya EA. Women marketer's perceived constraints on selected agricultural produce marketing in Enugu South Local Government Area: challenges of extension training for women groups in Enugu state, Nigeria. Agro-Science Journal of Tropical Agriculture, Food, Environment and Extension. 2010; 9(3):215-222.

QUESTIONNAIRE

Section A: Socioeconomic Data

- Q1 Gender male () female ()
- Q2 Age in years
- Q3 Marital status Unmarried () Married () Widow () Widower ()
- Q4 Faculty Agriculture () Art and Humanities () Education () Law () Management sciences () Natural Sciences () College of Health () Social Sciences ()
- Q5 Department
- Q6 Monthly of Income ₦5,000 - ~~₦~~ 20,000 () ₦ 21,000 – ₦ 60,000 () ₦ 61,000 - ₦100, 000 () ~~₦~~ 101,000 - ~~₦~~160, 000 () ₦ 161,000 – ₦200, 000 () >~~₦~~200, 000 ()
- Q7. Household size 1-5 () 6- 10 () >10 ()
- Q8. Source of income trading () Farming () Civil Service () Hand Work () Parent/guardians ()
- Q9. Level in school () 100L () 200L () 300L () 400L () 500L

Section B: Substantive Issues of Research

- Q10. Do you eat Fish? Yes () No ()
- Q11. What type of Fish do you consume? Ice fish () Tilapia () Cat Fish () Mackerel () Cray fish () Tuna others (specify) (You can select more than one)
- Q12. Do you prefer Fish more than other meat? Yes () No ()
- Q.13. What form of Fish do you consume most? (Please tick appropriately)

Forms of Fish consumed	Please tick
Ice Fish	
Dried Fish	
Grilled Fish	
Smoked Fish	
Fried Fish	

Others please (specify),

Q14. How often do you consume Fish per semester? Daily () weekly () monthly ()

Q15. Reasons for Fish consumption. (You can select more than one, please tick appropriately)

Reasons for Fish consumption	Please tick
Preference in Taste	
Health benefits	
Affordability of Fish	
Availability of Fish	

Others (please specify).....

Q16. Do you have any allergy to Fish consumption? Yes () No ()

Q17. Problems associated with Fish consumption. (You can select more than one and please tick appropriately).

Constraints	Very serious	Serious	Not serious
High cost of Fish			
Allergy to Fish smell			
Ignorance about Fish nutrients			
Proximity to market (closeness)			
Inadequate supply of Fish			
Poor storage facilities			
Low demand for Fish			

Others (please specify).....

Q18. What suggestion (s) will you give to enhance Fish consumption among students.....

© 2020 Oyibo et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
 The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/54281>