Fish Consumers' Behavior Analysis in Ibadan Metropolis of Oyo state, Nigeria

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Abstract

The awareness of consumers' choice of a product is an eye-opener to guide and develop a robust policy for such an industry. This study applied the descriptive statistics and Multinomial Logit (MNL) Model to analyse consumers' behaviour in fish products. Data for this study were collected from a primary source. Results indicated that consumers' choice among alternative fish products was influenced by income and education level of consumers. About 38%, 31% and 31% of respondents choose frozen, fresh and smoked fish, respectively as their main preferred products. The mean income was N 29929.41(USD71.49) per month with a standard deviation of N 34517.08(USD82.45). The average amount spent per day on fish consumption was N 1269.97(USD3.03) while the amount spent per day on substitutes for fish was N 1958.824 (USD 4.68). Factors that significantly influenced the consumers' behaviour for smoked fish were age, gender, marital status, household size, fish price per day, price of fish close substitute, health status and fish quality. It is recommended that these identified factors should be incorporated into policy formation by the stakeholders for the sustainable development of the fisheries industry.

Keywords:
Preference,
Choice,
Multinomial
Logit

1. Introduction

Fish is an aquatic nature organism which finds its base in the water medium. Fish possesses adaptive physical features, to enable them to survive in water (FAO, 2020). These features include, the mouth, operculum (gill cover) fins, eyes, lateral lines, scales, nostrils and barbell, among others. Fish play a significant role in livestock and fishery industries. According to Azeez et al., (2021), fish is a major source of food for humans, providing a significant portion of the protein (which is essential for healthy human growth), fats and fat-soluble vitamins intake in the diets of a large proportion of the people, particularly so in the developing countries. It is also used as a source of valuable medicinal, feeding and technical products. Fish is a cheap source of animal protein and fat with little or no religious rejection. This gives it an advantage over pork, chicken or other sources of meats. Fish is an important source of animal protein for many households.

Meta-analyses recently have revealed the existence of associations between red meat (beef, lamb, pork, and other mammalian meat) and stroke, coronary heart disease and heart failure (Bechthold et al., 2019), obesity (Rouhani et al., 2014), and all-cause mortality (Larsson and Orsini, 2014). Because of these relationships, organizations including the American Cancer Society recommend limiting red meat consumption in favour of poultry, fish, or plant-based proteins (Ibsen et al., 2020). However, despite the human health benefits of fish consumption, the consumption of fish in Nigeria is still not adequate (Theophilus, 2021).

There are numerous species of fish but the forms of fish products that are available to consumers in the market vary. In agreement with these and the prevailing circumstances, fish supply to the market could be fresh, smoked, fried, frozen and dried forms. From these, the consumers as rational beings have freedom of choice that will give the highest level of satisfaction (Ayanboye and Oluwafemi, 2020). The consumer choice among these forms of fish also could be influenced by numerous factors.

A number of literatures are available on consumer fish consumption preferences. For example, Rahman et al.,(2020), investigated consumer fish consumption preferences and contributing factors in Rangpur city corporation, Bangladesh. The result of their finding revealed that Rui (Labeo rohita), Pangas (Pangasius), Hilsha (Tenualosa ilesha) and Tilapia (Oreochromis mossambicus) were the most frequently consumed fish species. Significant differences in consumption level were observed among the age categories, profession, gender, education, and income levels ($p < 0.05$). Fish consumption level was significantly and positively associated with education and income levels and negatively associated with age categories ($p < 0.01$). The stepwise multiple regression method elucidated 53.7% of the variance ($p < 0.05$) for fish consumption. Johnson et al., (2020) employed Multinomial logit regression model (MNL) to analyse the impacts of socio-economic and fish-specific attributes of consumer choice for fresh fish. Their finding indicated that consumers' income, price of the fish, level of education, household size, experience and freshness had a significant impact on fresh fish choices. Qiujie et al., (2018) investigated factors influencing consumers' purchase intentions for sustainable wild salmon in the Chinese market and implications for agribusiness decisions using ordered logit model. The result of their study revealed that education, household size, increase in income over the last two years, dummy for Shanghai city, harvest methods, tasty, cleanliness, dinning venue (i.e. eat salmon at home, restaurants and both) had a positive and significant influence on consumers' purchase intentions while factors like preservation by frozen, place of eating salmon other than home and restaurants had negative but significant impact on the consumers' intention for wild salmon in the study area.

However, a review of available literature on fish consumption behaviour of the citizen in the study area using the multinomial model revealed scanty empirical studies. Available studies in the study area include, Fregene and Olanusi (2012), who conducted a study in Ibadan Metropolis of Oyo State (a land locked state) to determine the consumer preference and pattern of marine fish species consumed. Data collected was analyzed using descriptive statistics and Tobit regression model. Marine fish sellers ranked horse mackerel (Scomber japonicus) first and croaker (Pseudotholithus species) the least because it is more priced. Only 10.6% and 13.2% of the households preferred express (Brevortia species) and croaker respectively, but Hake (Gadus gadus) was the least preferred (41.7%). The household consumed varying proportions of fish species every week. The regression result ($R = 0.65$) showed that married household heads with large household size having lower years/level of education, younger in age and earning lower income are likely to consume more of marine frozen fish species ($P < 0.01$) than others. Jimoh et al., (2013) investigated factors influencing consumers' preference for frozen and fresh fish within Ibadan metropolis towards developing a functional fish processing strategy. Data were analysed using descriptive statistics and Chi-square contingency test for independence at 5%. Three out of nine socio-economic factors considered were significant; educational level, occupation and family expenses. Determinants of consumers 'preference for fresh and frozen fish in terms of taste, package, cost and availability were also significant. The result indicated no significant difference between mode of fish presentation on consumer' preference. Also, there was no significant difference between socio-cultural factors on consumers' preference for frozen and fresh fish. The study revealed that the level of education, nature of work as well as expenses affect preference for fresh and frozen fish consumption so also consumers' preference for fresh or frozen fish differs by taste, package, cost and availability of the fish.

Previous studies focused on marine fish and fresh fish without adequate consideration to include a preference for smoked fish, a common fish product in the area. This inadequacy creates a gap for this study to fill. This research is therefore aims at adding value to the existing body of knowledge by providing scientific-based information on fish consumers' behaviour in Ibadan metropolis area of Oyo state, Nigeria. Therefore, the results from this study are expected to provide relevant information for policy makers, industry and researchers. The following are the objectives of this study; profiling the socioeconomics characteristics of the consumers, forms of fish available in the study area and determining the key factors influencing fish consumers' behaviour in the choice of fish products they consume in the study area.

Theoretical / Conceptual Framework – Consumption Preference Theory

Generally, consumers are believed or assumed to be rational in their behaviour and choices to derive maximum satisfaction from available bundles of goods and services. A better understanding of the consumption theory of a given good is paramount to the growth and development of its market frontier. Getting the proper insight into consumer rationality is essential because it provides necessary information links between producers and marketers leading to appropriate recognition of what factors influence consumers' choices, Theophilus (2021) and Wake and Geleto, (2019). By understanding the nature of customers' behaviour of a product, the producer is adequately equipped to strategically meet aggregate market demand as well as increase the level of satisfaction with consumers' goals.

Moreover, rooting the concept of theory of consumer behaviour to analyse fish preference is desired to bring out the determinants of satisfaction from fish consumption. The satisfaction or utility of a given bundle of goods varies with a place, price, product, time or form. For instance, fish products could be consumed fresh, fried, dried, smoked, or frozen forms, (Can et al., 2015). The choice made by a given consumer is determined by many intrinsic, social, psychological and economic factors (Prabhu, 2020).

Furthermore, a thorough comprehension of consumer behaviour theory on fish seeks to answer and clearly explain why, what, when and how the consumer buys fish products that give them desired satisfaction (Kotler et al., 2017). Additionally, it demonstrates how people make decisions about what type of fish they buy and consume. This is called the decision process (Qazzafi, 2019). Undoubtedly, decisions on the type of fish products and what quantity to consume are believed to be affected by various factors such as socio-economics and geographic characteristics of consumers and fish attributes, Uddin et al., (2019). Consumer preference describes how a consumer rank and prioritize their utilities among a group of related goods. This provides a better relationship with actual purchase and consumption. Consumers' choice is viewed as a microeconomic theory that relates expenditure and preferences for consumption of goods and services together which culminate in consumer demand curves. The links between personal preferences, consumption and the demand curve are one of the most closely studied relations in consumer economics. As reported by Myriand et al., (2000), preference has been considered to be a major factor influencing general food consumption behaviour. According to Pieniak et al., (2008), tradition and habit are often affected fish consumption which could also be enhanced by nutritional awareness. Choice theory is a way of analyzing how consumers may achieve equilibrium preferences and expenditure by maximizing utilities as subject to consumer's budget constraints.

2. Materials and Methods
2.1 Study Area
The study was carried out in Ibadan metropolis, Oyo State. Ibadan is the capital of Oyo state, Nigeria and is found in the tropical region of Southwest, Nigeria. Ibadan was chosen for this study because it has a relative number of bodies of freshwater which boost artisanal fishery. It also consists of fish ponds where fresh fish could be raised and sold to people. Frozen fish depots are also available in the town. Smoked fish is also available at food markets in the Ibadan metropolis.

2.2 Sampling Procedures
A multi-stage sampling procedure was employed to select respondents. The first stage was the purposive selection of Ibadan town, the capital of Oyo state. A simple random sampling technique was employed in the second stage for the random selection of six (6) out of eleven Local Governments (LGAs) in Ibadan, and they include: Oluyole, Ido, Ibarapa, Ibadan North West, Ibadan South West and Lagelu Local Government. The third stage consisted of random selection of 200 respondents by probability proportional to size using the 2006 population data as the baseline. However, 170 copies of the questionnaire were well-filled and retrieved from the respondents. Data collected were thoroughly cleaned and subjected to the required statistical analysis to achieve the set objectives of this study

2.3 Data Analysis
The methods of data analysis adopted in this study were simple descriptive statistics and multinomial logit (MNL) regression. Descriptive statistics such as frequency table, mean and standard deviation were used to describe the socio-economic characteristics of the respondents. While multinomial logit regression model was used to determine the key factors influencing consumers' behaviour of their fish forms option in the study area.

2.4 Conceptual Framework of the Multinomial Logit Model (MLM)
The regression analysis is used in social sciences when the number of dependent variable categories are two, multinomial logistic regression is employed when dependent variables involve three or more categories. This explains the correlation between the dependent variable and the independent variable when their values are obtained with rating scales (Washington et al., 2003; Hosmer et al., 2013). The application of the Multinomial Logit Model (MLM) has extensively been used to determine the force behind a consumer's choice. This includes Imre and Gábor (2002); Selim et al., (2003). The model springs from the theory of rational choice of consumption of a product within a probabilistic framework. The model applies the utility maximization hypothesis which assumes that a decision maker's choice is the result of their preferences (McFadden,1974). According to Gary et al. (2007), the model is based on four core concepts: (i) the customer has an unobservable (at least to the modeller) preference or utility for each of the choice alternatives, (ii) the utility of each choice alternative is composed of two additive terms namely, a deterministic component (the intrinsic value or attractiveness of the choice alternative), and a random component that varies

randomly across choice alternatives, customers, and purchase occasions, (iii) the distribution of the random component can be specified, and (iv) on each choice occasion, the customer chooses the alternative that provides him or her the highest utility. Consequently, the decision-maker is assumed to select the alternative with the highest preference or utility.

2.5 The Model Specification

Let π_j denote the multinomial probability of an observation falling in the jth categories of fish forms option, to find the relationship between this probability and the p -explanatory variables, X 1, X2,........., X p, the multinomial logistic regression model is given thus:

$$\text{where } j=1, 2 \dots (k-1), i = 1, 2 \dots p. \tag{1}$$

k = number of response or dependent categories (fish forms option).

Note: one of the categories must be considered the base level and all the logits are constructed relative to it.

P = number of explanatory variables included in the model.

Since all the π add to unity, this reduces to

For j = 1, 2, …. (k-1), the model parameters are estimated by the method of multinomial logit   (2)

X1= Gender (male = 0, female = 1)

X2= Age (in years)

X3= Marital Status (single = 0, married = 1)

X4= Level of education (Non-formal = 0, formal =1)

X5= Household size (numbers)

X6= monthly income (naira)

X7= fish expenditure (naira)

X8= fish substitute expenditure (naira)

X9= fish taste (Yes = 1, No = 0)

X10=health factor (Yes = 1, No = 0)

X11=fish odour/aroma (Yes = 1, No = 0)

X12=fish appearance (Yes = 1, No = 0)

X13=nutritional quality (Yes = 1, No = 0)

μ_{it}=Error term

3. Results and Discussion

The result of the analysis of socioeconomic characteristics of fish consumers in the study area is presented in Table 1. A typical fish consumer in the study area was young with an average of about 35 years and a standard deviation of about 11 years. The distribution shows that more than 73% of the respondents were within the age bracket of 40 years. This implies that many of the fish consumers in the locality are at a productive stage and they would require high-quality protein in their daily food consumption. According to Uzundumlu (2017), age was found to be significantly associated with an interest in healthy eating. Pieniak et al., (2010) also discovered a relationship between age and knowledge. Therefore, fish with a high profile of protein contents has been reported as a valuable source of essential nutrients, especially high-quality protein and fats (macronutrients), vitamins and minerals (micronutrients) that make a vital contribution to the world's food and nutrition (FAO, 2020).

The results reveal that about 58% of the respondents were female and approximately 42% were male. It could be inferred that there is no serious gender discrimination against fish consumption in the locality. This is also in agreement with the findings of Uzundumlu (2017). The higher percentage of females indicates that women are usually in charge of food preparation for most households in the study area. It was also observed that a larger proportion of males were bachelors. Generally, the positive behaviour of fish consumers is observed towards a well-preserved fish product form because it could be kept for a long time when bought and easily accessible if other alternatives or substitutes are not affordable and reachable at the time of need.

The majority of fish consumers have formal education. This is evident as close to 72% of respondents have at least primary school educational qualifications. Generally, the influence of education on human behaviour towards the consumption of healthy food could not be overemphasized. A typical educated person would prefer to choose a healthy and balanced diet that will not result in ill-health such as cholesterol and other similar health challenges. Trondsen et al. (2004) also emphasized that consumption of fishery products was positively associated with education. It is well known that red-meat consumption is being discouraged for health reasons, while consumption of white meat, of which fish is one source, is being encouraged among educated societies (Rock et al., 2020). This is evidence of the influence of education on human behaviour toward food consumption.

A larger proportion of the fish consumers in the study area were married. Being married imposes responsibilities on the household breadwinner and one of such responsibilities is a provision of a healthy and balanced diet for family members. Fish is common in household dietary food consumption due to many factors; it is a cheap, source of vitamins, minerals, a protein with essential amino-acid, easy to digest and less cholesterol (FAO, 2020). For these reasons, most married households choose different forms of fish products for their satisfaction.

In the study area, 35%, 50% and 14% of the respondents have household sizes of 1-3, 4-6 and 7-9, respectively, while the average household of a typical family was about 4 persons with a standard deviation of 2.1. This result is in agreement with the findings of Uzundumlu (2017). According to Trondsen et al., (2004), fish consumption was found to be positively correlated with household size. However, Verbeke and Vackier (2005) found a contrary result. This shows that residents in the study area keep moderate family sizes and this could be attributed to the education among the sample population.

The mean income of N 29929.41 (USD71.49) per month with a standard deviation of 34517.08 (USD 82.45) per month were obtainable among the fish consumers in the study. This shows that the monthly income of most of the respondents was relatively low. The low monthly earnings of the respondents could negatively influence their choice and consumption of their desired and preferred fish products. Burger et al. (1999) and Hicks et al. (2008) opined that income levels might affect fish consumption. The average amount spent per day on fish consumption in the study area was N 1269.971(USD 3.03) with a standard deviation of N1243.69 (USD 2.97). Given the current rate of food inflation, this amount was low. The combined effects of low monthly income, household size and high food inflation would result in inadequate consumption of daily dietary protein that is obtainable from fish.

Also, the amount spent per day on substitutes for fish was N 1958.824(USD 4.68) and this value was found to be relatively low. It could be deduced that the price of fish and other sources of protein might be a major constraint and negatively influence fish consumption among the population in the study area.

Table 1. Socioeconomics Characteristic of Fish Consumers

Variable	Frequency	Percentage (%)	Mean ±S.D
Age			
21-30	68	40	
31-40	56	32.94	35.29±10.55
41-50	30	17.65	
>50	16	9.41	
Gender			
Male	72	42.35	
Female	98	57.65	
Educational Status			
Non Formal	48	28.24	
Formal	122	71.76	
Marital Status			
Single	62	36.47	
Married	108	63.53	
Household size			
1-3	60	35.39	4.4±2.1
4-6	86	50.49	
7-9	24	14.12	
Monthly income (N)			
<10,000	62	36.47	
10,000 -50000	82	48.24	N29929.41± 34517.08
50001-100000	22	12.94	
>100000	4	2.35	
Fish expenditure per day			
<500	32	18.82	
500 -1000	84	49.42	
1001-1500	14	8.23	N 1269.97± 1243.69
1501-2000	12	7.06	
>2000	28	16.47	
Fish substitute expend. Per day			
<500	2	1.18	

500 -1000	66	38.82	
1001-1500	14	8.24	N1958.82±1162.98
1501-2000	14	8.24	
>2000	74	43.52	

3.1 Fish Product Forms and Quality of Parameters Considered by the Consumers

In the study area, the common forms of fish products identified by the respondents are fresh fish, smoked fish and frozen fish. While the attributes considered include taste, health factors, appearance, odour and nutritional quality. The results in Table 2 showed that the fish products available were almost evenly distributed among the consumers in the study area. It was revealed that no less than 39%, 31%, and 31% of the sampled consumers preferred fish in form of frozen, fresh, and smoked fish, respectively. This implies there is no clear-cut high preference for a particular fish product among the consumers. The finding from this study may be attributed to low income. The value (42%) of consumers preferring fresh fish in the study by Johnson et al., (2020) was higher than the value gotten in this study. On the other hand, the taste of the fish product is of utmost concern to the people in the locality of this study. This is noticeable in the response of about 87% of the fish consumers who reported that fish aroma positively influences their preference for their choice. This was in consonance with the findings of George et al., (2017) and Ratliff (2017) that were conducted in Vietnam and South Carolina, both reported that taste is a preference for consuming fish. Also, 68% considered health factors as their inducement for their fish consumption. Azabagaoglu et al., (2016) found in their study conducted in Turkey on consumer's fish purchase behaviour, that the major reason for consuming fish was because of its healthiness. The claim was also supported by the report of Johnson et al., (2020) that healthiness and taste have a positive and significant impact on consumers' decisions on fish consumption. The appearance of fish was found to affect about 65% of the consumers' behaviour towards their choices. Menozzi et al., (2020) also reported a positive premium for nutritional and health claims, with high heterogeneity across the countries and species. Rahman et al., (2020) advocated that fish consumption should be continued throughout the year for healthy and balanced diets. Since fishes come with different odours, about 79% of the consumers in the study area considered the odour of the fish they consumed. The above result is in agreement with the findings of Honkanen et al., (2005) and Rahman et al., (2020), who affirmed that food preferences are affected by several sensory (taste, smell, and texture) and non-sensory factors (behaviour, beliefs, personal characteristics, and risk perception). In the study area, it was observed that the respondents were not so concerned about the nutritional quality of the fish consumed as indicated by 61%. This may be a result of their low monthly income and rising food prices. Unlike in developing countries, higher demand for food consumption has been attributed to increased income in developed countries (Cantillo et al., 2021). Zhou et al., (2016) and Ratliff (2018) documented that the low consumption of fish and fish products especially in developing countries is due to consumer's income constraints. Louis et al., (2022) submitted that the nutritional value is a significant determinant relating to the increased consumption frequency.

3.2 Results of Multinomial Logit (MNL) Regression Analysis

Table 3 shows the results of the multinomial logit regression analysis performed to determine the factors that influence the independent choices made on fish forms by the fish consumers in the study. Fresh fish was used as a base category for the analysis; therefore, the discussion will be with reference to fresh fish. The study performed diagnostic tests for the desirability of the MNL results. The independent irrelevant alternatives (IIA) assumption results showed that the coefficient is not different from zero. This implies that the IIA assumption is not violated given the probability level of 0.235 and this suggests that our model is suitably stated for modelling consumers' choice of fish form in the area. The Log-likelihood estimate is rightly signed which means that the value maximizes the joint densities in the model. Also, the likelihood ratio (LR) is statistically significant at a 1% level, indicating that the explanatory variables jointly exert influence on the choice of fish form consumed by the respondents. The Table also revealed that variables such as age, gender, marital status, household size and fish price are significant in affecting the smoked fish, while gender, household size, fish price, fish substitute, health status and fish quality are significant in addressing frozen fish instead of consuming fresh fish in the area. The coefficient of age was positive and significant at a 10% probability level. This means that as the consumer gets older the chance of consuming smoked fish is increased by 4.2% compared to fresh fish. The probable reason might be that the aged consumers might have been advised to eat smoked fish because of the health reason and also to preserve the shelf life of the fish so that they will not be going to the market each time they want to consume fish. The result is similar to the findings of George et al., (2017) and Johnson et al., (2020) that were carried out in Vietnam and Nigeria, respectively, where age positively influenced the choice of the fish consumers. Louis et al., (2022) found out that the highest probability for a consumer to increase their consumption frequency levels for smoked fish is related to availability on shelves.

Table 2. Fish Product forms and quality of parameters considered by the consumers

Variables		Frequency	Percentage
Forms of fish	Fresh	52	30.59
	Smoke	52	30.59
	Frozen	66	38.82
Taste	No	22	12.94
	Yes	148	87.06
Health factor	No	54	31.76
	Yes	116	68.24
Appearance	No	60	35.29
	Yes	110	64.71
Odour	No	36	21.18
	Yes	134	78.82
Nutritional quality	No	104	61.18
	Yes	66	38.82

The results of the gender were significant at a 1% level for smoked and frozen fishes. The negative sign of the gender means that female consumers prefer smoked fish to fresh fish compared to their male counterparts. While the positive sign of the gender indicated that male consumers prefer frozen fish to fresh fish compared to their female counterparts. It can be deduced that males in the area prefer frozen fish while females prefer smoked fish compared to the fresh fish in the area. The study of Menozzi et al., (2020) reported that gender greatly influences consumer preference for a fish product, while Johnson et al., (2020), though insignificant, reported that males have a preference for fresh fish.

Marital status was negative but only significant at 1% level in influencing the probability of consuming smoked fish. This is an indication that being married reduces the likelihood of consuming smoked fish compared with fresh fish in the area. The preference for fresh fish could be because married women like to satisfy their husbands with freshly prepared meals. This agreed with the findings of Adeli and Hassannejad, (2020) in Gorgan City, Iran and Jimoh et al., (2013) in Ibadan, Nigeria, who discovered a clear preference for fresh fish in their studies. Contrary to this study, George et al., (2017) stated married households showed a positive and significant influence on the willingness to pay for fresh fish among consumers in Vietnam. Household size was significant at 10% level apiece for smoked and frozen fishes, apiece. It can be interpreted that a positive household coefficient means that a person's increase in the family size will likely increase the consumption of smoked fish compared with fresh fish. This is possible because a large family will want to buy fish that could last for a while at home so that they will not be going to the market every time. However, the coefficient negatively influenced the probability of consuming frozen fish instead of fresh fish. This means that a large family prefers smoked fish because of its shelf life as the fish might not be used up at a time. Oladimeji et al., (2019) observed family size significantly influences the preference for the choice of fish farm risk status in Nigeria. But the result disagreed with the finding of Johnson et al., (2020) who reported that household size was always negative in determining consumer choice behaviour for fresh fish types. The coefficient of fish price was statistically significant at 1% and 10% levels for smoked and frozen fish, respectively. It was negatively associated with frozen fish, meaning that a unit increase in the price of fish will likely reduce the probability of consuming frozen fish by 0.03% instead of fresh fish. Also, the coefficient was positive with smoked fish, meaning that a money increase in the price will lead to a chance of consuming smoked fish by 0.06% instead of fresh fish. It has been stated that changes in price cause changes in quantity demanded. Thus, a change in price will make people buy smoked fish at home because it will take some time to rot, unlike frozen and fresh fish.

George et al., (2017) also reported that changes in price affect freshwater fish compared with other forms. Thus, price constituted one of the attributes of choice where households considered the low price to be more relevant. A change in the price of fish substitutes such as meat will make the consumers consume more smoked fish than fresh fish but it decreases the likelihood of consuming frozen fish. The argument is still based on the perishability of both fresh and frozen fishes when not consumed in a very short time. It is worth noting that consumers in the area always buy fish on the market day which is an interval of two or three days. It always pays them to buy goods that will take them till the next market day. Hence, gives more preference for smoked fish. The coefficient of health status was positive and significant at 10% level in affecting the probability of consuming frozen fish instead of fresh fish. It depends on the location and availability of fish; one will want to buy frozen fish when the fresh fish is not always available on all days. This is always common for those that are recommended to always consume fresh fish due to health challenges. The study shared a similar view with the findings of Azabagaoglu et al., (2016) and Johnson et al., (2020) who stated that the major reason for consuming fish in Turkey and Nigeria, respectively was because of its healthiness. Rahman et al., (2020) also stated that due to numerous health benefits for humans, it is paramount to consume fish for a healthy life. Fish quality also negatively influenced the choice of frozen fish but was statistically significant at 1% level. It means that perceived being a quality fish will reduce the probability of consuming frozen fish instead of fresh fish in the area. It means a rational consumer will like to consume quality fresh fish mostly cropped

alive. It has been also argued by Rahman and Islam (2019) that fish consumption frequencies and their perceptions are influenced by sensory factors such as quality, taste, freshness and smell. Altintzoglou and Heide (2016) stated that the quality of fish is a key factor in the determinants of fish preference and consumption. The coefficients of income and education were positive but insignificant at 5% probability level. It can still be deduced that they positively influenced preference for fish consumption. This is supported by the findings of Louis et al., (2022) who reported that income and education influence the chance of moving to a higher consumption frequency level.

Table 3. Parameter estimates of multinomial logit regression for fresh fish product

Fish product forms	Smoke fish			Frozen fish		
Variables	Coefficients	z	P>|z|	Coefficients	z	P>|z|
Age	0.0415365*	1.82	0.069	-0.0234962	-1.16	0.247
Gender	-1.056471***	-2.51	0.012	1.210067***	2.98	0.003
Marital Status	-1.321026***	-3.21	0.001	0.1634163	0.44	0.662
Education status	0.6706687	1.45	0.146	0 .2236792	0.50	0.617
Household size	0.207212*	1.73	0.084	-0.1986693*	-1.69	0.091
Monthly income	8.47e-06	1.31	0.189	3.38e-06	0.63	0.528
Fish price	0.0006495***	3.25	0.001	-0.0003288*	-1.89	0.059
Fish subs. price	0.0004224**	2.28	0.023	-0.0004928***	-2.65	0.008
Fish Taste	-16.05645	-0.02	0.985	17.14352	0.02	0.984
Health status	15.67552	0.01	0.989	1.032233*	1.67	0.095
Fish Odour	-1.375388	-0.00	0.999	0.4780953	0.00	1.00
Fish appearance	14.80692	0.02	0.983	-13.66837	-0.02	0.985
Fish quality	19.01946	0.02	0.986	-3.519471***	-4.43	0.000
Constant	-18.01946	-0.02	0.986	0 .2656968	0.23	0.819
Log likelihood	-254.42124					
Likelihood ratio	233.71					

Significant level: 1%, 5% and 10% ***, ** and *, respectively

4. Conclusion and Recommendation

This paper had critically examined fish consumers' behaviour analysis in the Ibadan metropolis. This research showed that an average fish consumer in the study area was young and economic active given an average of about 35 years. About 58% of the respondents were female and married with an average household of about 4 persons with nearly 72% of them having a formal education. About 38%, 31%, and 31% of respondents preferred frozen, fresh, and smoked fish, respectively. The mean income was N29929.41 ($ 71.49) per month, while the average amount spent per day on fish consumption was N 1269.97 ($ 3.03). The amount spent per day on substitutes for fish was N 1958.824 ($ 4.68) not less than 87% of the fish consumers considered fish aroma, 68% health factor, 65% fish appearance, and 61% fish quality. Generally, factors that influenced the consumers' behaviour toward fish form consumptions are age, gender, marital status, household size, fish price per day, price of fish close substitute, health status and fish quality. The study concluded that food preference and consumption are induced based on individual cultural background, prevailing economic power, social class and strata, health status, age, occupation and employment status, education, gender, etc. Specifically, our regression estimates have established that the preference and choice of a given fish product by the individual consumer could be influenced by the price, price of close substitute, taste and fish species, health factor, appearance, taboo, odour, nutritional quality and household size. Having said that, the impacts of demographic, cultural, economic and institutional factors on fish consumption deserve further investigation by adding more variables that were excluded in this study.

Recommendation

Based on the findings of this study, we come up with the following recommendations.

1. Government and private organisations should encourage the increase of cultured fish production. This will lower fish prices and enhance the consumption rate. This could be achieved through extension tools such as training, workshop, seminar, and the like.

2. Research should be funded by the government to work on the genetic manipulation of fish odour, taste, fleshiness and quality so as to meet the interest, wishes and needs of the consumers. This will increase sales in the consumption community and also enhance income generation to the producers. It can also help to change the consumers' consumption habits and preferences.

3. For more fish freshness, the provision of storage facilities and other processing technologies should be made available to the producers. Government can subsidize the equipment and also collaborate with the farmers' cooperative society for proper monitoring and maintenance.

4. Policies that educate consumers about the quality, product labelling and different claims and certifications should be strengthened in the country. This will help in protecting consumers and also ensure health safety in fish consumption.

5. It is imperative to encourage more youths and women to participate in fish production and processing due to the increase in demand and preference for fish among other substitutes. This will help young people with farming skills when they are still energetic to promote the consumption of fish.

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