



Analysis of Factors Influencing Household Preference Level for Seafood in Southwest Nigeria

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Seafood is known worldwide as a very important component of human diet because of its high nutritive value and significance in improving human health. The study examines the factors influencing households' preference level for seafood and determines the factors inducing the choice of seafood consumption by households in Southwest Nigeria. Multi-stage sampling technique was used to select 300 households in Oyo and Lagos States, Southwest Nigeria. Ordered probit regression model was used to examine the factors influencing household preference level for seafood and multinomial logistic model was used to determine the factors inducing the choice of seafood consumed by the households in the study area. The ordered probit model estimation results revealed that access to seafood within 1km – 4km was significant at 5% and positively relates to household preference for seafood. Increase in income of the household will increase the likelihood of having high preference for seafood (14.39%) by the respondents in the study area. Multinomial logistic model results revealed that the education level of the respondents influenced the choice of croaker fish by 12.01% relative to shrimp in the study area. Therefore, the study recommends that seafood marketers should ensure a good distribution network that will enhance its accessibility within one and four kilometers in the study area.

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1. INTRODUCTION

Seafood is any form of marine life regarded as food by humans. Seafood includes fish, molluscs (octopus and shellfish), crustaceans (shrimp and lobster), and echinoderms (sea cucumber and sea urchins). In some countries like Nigeria, the term "seafood" is also applied to freshwater organisms eaten by humans, so all edible aquatic life may be referred to as seafood [1]. Seafood is known worldwide as a very important component of human diet because of its high nutritive value and significance in improving human health. It contributes significantly to the survival and wellbeing of many people around the world. It is an important source of essential nutrients which include protein, lipids, vitamins, and minerals [2]. Seafood is known to be an efficient converter of food for human consumption and saves children from kwashiorkor due to low protein intake and unbalanced diet. Additionally, there is little or no religious restriction on its consumption in Nigeria [3]. It is relatively cheaper and readily available, therefore, making quality protein available to the poor people in most developing countries of the world including Nigeria [4]. The commonly consumed seafoods in Nigeria are fillet, shrimps, calamari, crabs, lobsters, grouper, and croaker. (Federal Department Fisheries (FDF), 2019).

Furthermore, seafood is currently accepted as an essential food for humans and is highly regarded for its abundance of high-quality proteins, n-3 Polyunsaturated fatty acids, and other nutrients, such as minerals, trace elements, and vitamins [5]. These nutrients are essential for bodily functions and are beneficial to growth, the brain, and the nervous system; they also have anticancer properties [6]. Seafood has helped alleviate food crises in many developing countries, providing a valuable supplement to a diverse and nutritious diet. In recent years, seafood consumption has gradually increased throughout the world (FAO, 2010). Again, seafood production has contributed immensely to the economy as it employs 53% of the active labour force in the agricultural sector of the Nigerian economy [7]. Though seafood is very cheap and highly consumed in the country, it is being consumed below the global average. The National Bureau of Statistics (NBS) (2017) reported that household expenditure in Nigeria was more on seafood compared to meats (beef,

mutton, pork, and goat) especially in the rural areas in the last ten years. Hence, there is a need to determine the factors influencing households' preference level for seafood in Southwest Nigeria.

Therefore, the study examined the factors influencing households' preference level for seafood and determined the factors inducing the choice of seafood consumption by the households in Southwest Nigeria. This is to enhance the formulation of efficient and effective policies that will encourage the consumption of seafood in the study area.

2. METHODS

2.1 Study Area, Source of Data, Sample Techniques and Size

The study was conducted in Lagos and Oyo States respectively. The two states were purposively selected for the study because of their high consumption of seafood in Southwest Nigeria (National Bureau of Statistics [8]. The two states are made up of 70 Local Government Areas (i.e., Lagos state has 37 and Oyo state has 33 Local Government Areas). The population of the two states is 20,4435,005 (i.e., Lagos is 14,862,111 and Oyo is 5,580,894) (National Population Commission (NPC), 2016). Data for the study were from primary source. Primary data were collected with the use of well-structured questionnaire. Some of the data that were collected included the socio-economics characteristics, consumptions of seafood, price of seafood and income of the respondents.

Multistage sampling technique was used to select the respondents. In the first stage, there was purposive selection of two states (Lagos and Oyo) because the two states are known for seafood consumption in southwest Nigeria (National Bureau of Statistics [8]. In the second stage, two Local Government Areas (LGAs) within the capital of each state (Ikeja LGA and Eti-Osa LGA in Lagos State and Ibadan Southwest LGA and Ibadan Northwest LGA in Oyo State) were selected for the study as shown in Fig. 1. The third stage involved random selection of five communities in each of the LGAs. In each community, 15 households were selected for the study. Therefore, three hundred (300) households were interviewed for the study.

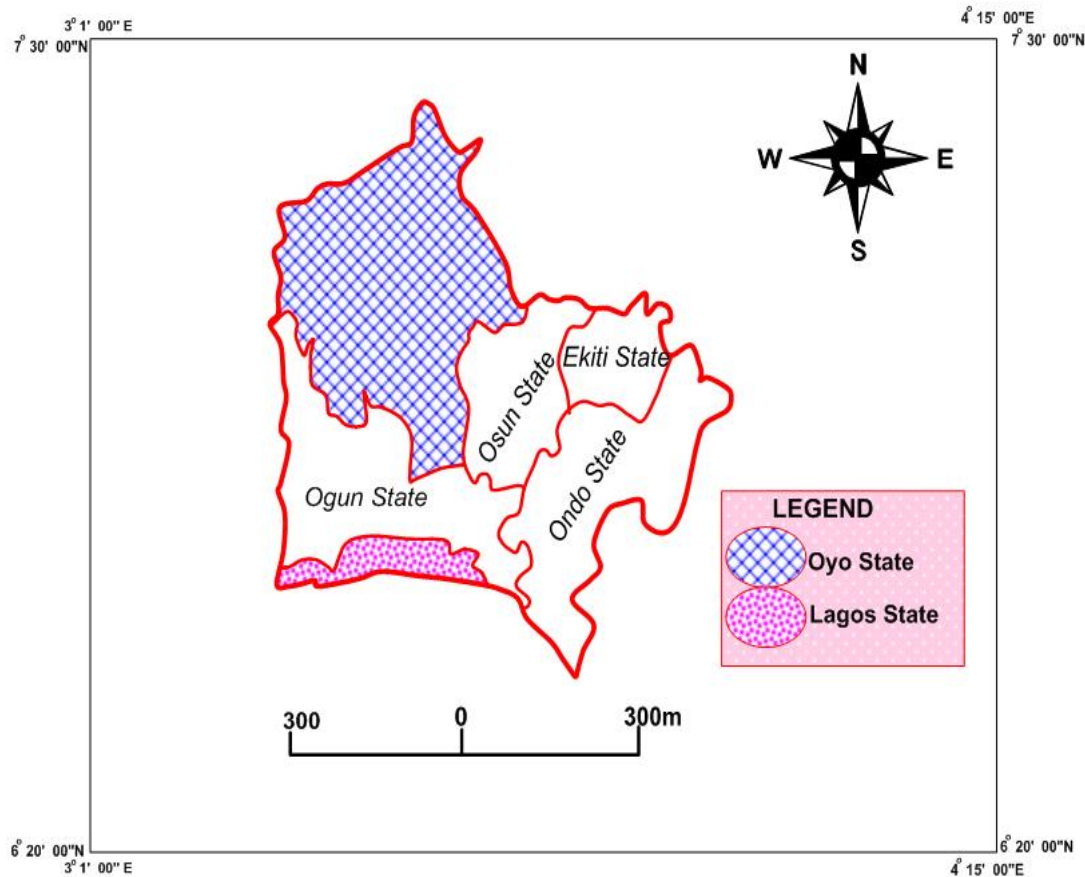


Fig. 1. Map of study area

2.2 Data Analysis and Model Specification

The study used the ordinal probit regression model to determine the factors that influence the households' preference level for seafood in the study area. The method is suitable when applied to the analysis of the dependent variable as an ordinal scale [9]. The dependent variable in this study is preference level for seafood, expressed as an ordinal scale with three dimensions. The level of preference was measured using a scale of 1-5 (not preferred = 1, least preferred = 2, indifferent = 3, preferred = 4, most preferred = 5) based on if the respondents (Households) preferred a seafood or not. The commonly consumed seafoods in Nigeria were fillet, shrimps, calamari, crabs, lobsters, grouper, and croaker.

The preferences for the seafood were measured using the above scale: The mean score of the respondents based on the 5-point scale was computed as:

$$5 + 4 + 3 + 2 + 1 = \frac{15}{5} = 3.00$$

Using the interval scale of 0.50, the upper cut-off point was determined as $3.00 + 0.50 = 3.50$; the lower limit as $3.00 - 0.50 = 2.50$.

Therefore, mean scores below 2.50 (i.e. $MS < 2.50$) were ranked Low Preference (LP); those between 2.50 and 3.49 were considered as Moderate Preference (MP), while mean scores that were greater than or equal to 3.50 (i.e. $MS \geq 3.50$) were considered as High Preference (HP).

This was done because the dependent variable is of ordinal categorical nature derived through a scale which required the respondents to indicate the extent to which they preferred seafood under the three categories as: High = 3, Moderate = 2 and Low = 1. The ordinal probit model is built around a latent regression in the same manner as the binomial probit model.

The Ordered regression model is specified below:

$$\text{Let } Z^* = \beta'X + \varepsilon_i \quad (1)$$

where;

Z_i^* = latent variable representing levels of preference for seafood (1 = Low preference level, 2 = Moderate preference level and 3 = High preference level).

X_i = vector of respondents' characteristics relevant in explaining the levels of preference for the seafood.

β = vector of parameters to be estimated

ε_i = normally distributed error term

Thus, the model can be further expressed as:

$$\begin{aligned} \text{Prob}(Z=3) &= F(\beta'X) && \text{if } \varepsilon_i < \beta'X \\ \text{Prob}(Z=2) &= F(\beta'X + a) - F(\beta'X) && \text{if } \beta'X < \varepsilon_i < \beta'X + a \\ \text{Prob}(Z=1) &= 1 - F(\beta'X + a) && \text{if } \varepsilon_i > \beta'X + a \end{aligned} \quad (2)$$

a> 0 is a parameter.

b>

Where F denotes cumulative probability distribution function. This model used the maximum likelihood method to estimate vector β' of the independent variable X .

The independent (explanatory) variables that were used in examining the preference level of respondents for seafood are specified below:

X_1 = Sex of respondents (1 = male, 0 = female)

X_2 = Marital status (1 = married, 0 if otherwise)

X_3 = Age of respondents (years)

X_4 = Income

X_5 = Household size

X_6 = Age²

X_7 = Access to seafood within 1km – 4km

X_8 = Level of education

X_9 = Price of seafood

U_i = Error term.

Multinomial logistic model was used to determine the factors inducing the choice of seafood consumed by the households in the study area. In this study, households have several seafoods from which they can choose. It is important to treat the consumption of seafood as multiple-choice decisions made simultaneously. Therefore, the multinomial logit model was used to identify factors influencing respondents' choice of seafoods.

The households' decision of whether to consume a particular seafood was considered under the general framework of utility or profit

maximization. A linear random utility model, as specified by Greene (2000), was adopted. This linear random utility model is commonly used as a framework in determining households' choice of seafood and specified as:

$$Y_{ij} = \beta_j' X_{ij} + \varepsilon_{ij} \quad (3)$$

where Y_{ij} is the utility of household i derived from seafood choice j , X_{ij} is a vector of factors that affect the decision to consume a particular seafood choice j , and β_j' is a set of parameters that reflect the impact of changes in X_{ij} on Y_{ij} . The disturbance terms ε_{ij} are assumed to be independently and identically distributed. If a particular seafood j is chosen, then Y_{ij} is the maximum among all possible utilities. Thus;

$$Y_{ij} > Y_{ik}, k \neq j \quad (4)$$

where Y_{ij} is the utility to the i th household from the consumption of seafood k . Eq. (2) means that when each seafood is thought of as a possible decision, respondents choose the seafood that maximizes their utility given available alternatives [10]. The choice of j depends on X_{ij} , which include aspects specific to the household and plot, among other factors. Following Greene, (2000), if Y_i is a random variable that indicates the choice made, then the multinomial logit (MNL) form of the multiple choices problem is given by;

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j' x_j^i}}{\sum_{j=1}^J e^{\beta_j' x_j^i}}, j=0, 1, 2 \dots J \quad (5)$$

Estimating Eq. (3) provides a set of probabilities for $j+1$ seafood for a decision maker with characteristics denoted by X_{ij} . The equation can be normalized by assuming that $\beta_0=0$. Therefore, the probabilities can be estimated as:

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j' x_j^i}}{1 + \sum_{j=1}^J e^{\beta_j' x_j^i}} \text{ and:} \quad (6)$$

$$\text{Prob}(Y_i = 0) = \frac{1}{1 + \sum_{j=1}^J e^{\beta_j' x_j^i}} \quad (7)$$

Normalizing on any other probabilities yields the following log-odds ratio:

$$\ln \left[\frac{p_{ij}}{p_{ik}} \right] = X_i' (\beta_k - \beta_j) \quad (8)$$

The dependent variable is the log of one alternative relative to the base/reference alternative. The MNL model coefficients are difficult to interpret. So, the marginal effects of the explanatory variables on the choice of alternative seafood are usually derived as:

$$mi = \frac{\partial P_i}{\partial x_j} = P_j \left[\beta_j - \sum_{k=0}^J P_k \beta_k \right] = P_j [\beta_j - \beta] \quad (9)$$

2.3 Definition of Variables

The dependent variable (Y_i) in this study is the chosen seafood. The dependent variable for Multinomial Logit Model (MLM) is described as follow: $Y_i = 1$ if a household is willing to consume fillet ($j=1$); $Y_i = 2$ if a household is willing to consume calamari ($j=2$); $Y_i = 3$ if a household is willing to consume crabs ($j=3$); $Y_i = 4$ if a household is willing to consume lobsters ($j=4$); $Y_i = 5$ if a household is willing to consume grouper ($j=5$); $Y_i = 6$ if a household is willing to consume croaker ($j=6$). Shrimp is the base category because it is the most common seafood in the study area. The marginal probabilities measure the expected change in the probability of a particular choice being selected with respect to a unit change in an independent variable (Dinku, 2018).

The independent variables that were used are below;

- X_1 = Sex of respondents (1 = male, 0 = female)
- X_2 = Marital status (1 = married, 0 if otherwise)
- X_3 = Age of respondents (years)
- X_4 = Income
- X_5 = Household size
- X_6 = Age²
- X_7 = Access to seafood within 1km – 4km
- X_8 = Level of education
- X_9 = Price of seafood
- U_i = Error term.

3. RESULTS AND DISCUSSION

3.1 Statistical Description of Samples

From the demographic result, the gender variation of the respondents, as observed on the field, showed that 40% of the respondents were males and 60% were female. The results further revealed that about 72% of the respondents were within the working productive age (i.e., 18 years to 60 years) and this was buttressed by the mean age of 52.10 years. The marital status of respondents revealed that about 91% of the

respondents were married. This gives room for taste evaluation of the seafoods consumed within the family setting. The study revealed that the level of education of the respondents was high, tertiary educational level had a modal frequency distribution of 102 representing 56.7%. According to Olarinde and Kuponiya (2014), "Education is an important factor that determines willingness to consume nutritious food such as seafood". It provides readability, consciousness, and awareness, which enhance better decisions to be made. The higher the level of respondent's education, the better his decision-making ability, especially in the consumption and affordability of nutritious and healthy food [11]. The respondents mean household size was five in the study area.

3.2 Ordered Probit Model on Factor Influencing Seafood Consumption in the Study Area

The ordered probit model estimation results which show factors influencing household preference level for seafood are presented in Table 1. According to Katchova and Dinterman, [12] the presence of two intercepts which are the threshold parameters indicate that there are three different categories. The threshold parameters δ_1 and δ_2 are significant at 5% level, which implies that the ordered probit model with three different preference levels is appropriate. The log likelihood value of -131.02 indicates that the explanatory variables used in the ordered probit model are appropriate. The probability value of 0.010 for chi squared of 53.0132 shows that at least one of the parameters of the variables is different from zero. The empirical results from the analysis revealed that the price of seafood was significant at 1% level, income, household size, age², access to seafood within 1km – 4km and level of education were significant at 5% level.

There was a positive relationship between level of education and preference for seafood which implies that the respondents' level of education will influence preference for seafood in Nigeria. Higher level of education will enhance the respondents' ability to appreciate the need for seafood as a source of nutrition. Positive relationship equally exists between the age² of the respondents and the preference for seafood in Nigeria. The older (Above 60 years) the respondents are, the more they will prefer seafood to cow meat, goat meat and pork. Hence, as the respondents grow older, their preference for seafood will be increasing [13].

Respondents' income was significant at 5% and positively related to household preference for seafood showing that increase in the level of household income is likely to increase the probability of having higher preference for seafood. Since there will be more disposable income for the household to buy seafood. This buttresses the findings of French et al. [14] that increase in household disposable enhances the consumption of choice food. Access to seafood within 1km – 4km was significant at 5% and positively related to household preference for seafood showing that increase in access to seafood will likely increase the probability of higher preference for seafood. If the respondents will not incur an extra cost to access seafood, then they will have preference for it. This is in line with the finding of Evans et al. [15] that there is a high preference for those goods that are sold within the neighborhood than those sold outside the neighborhood. Price of seafood and household size of the respondents were negatively significant at 1% and 5% respectively. Increase in the price of seafood will likely affect the preference for seafood negatively in the study area. This is in line with the findings of Bittenbender [16] that increase in the price of seafood will discourage its consumption. Likewise, increase in the household size will reduce the household preference for seafood.

Therefore, household with large household size will not prefer seafood, because seafood is more expensive compared to red meat and goat meat in the study area (National Bureau of Statistics (NBS), 2019).

The marginal effect for the independent variables is reported in Table 1. Marginal effect measures the response of household preference level towards seafood consumption when there is a unit change in the explanatory variables. The marginal effect for income indicates that an increase in the income of the household will increase the likelihood of having high preference for seafood by 14.39%, moderate preference by 11.59% low preference by 2.81% respectively by the respondents in the study area. As shown in Table 1, increase in household size above the mean household size of five in the study area will probably lead to decrease in the high preference, moderate preference, and low preference for seafood by -5.48%, -1.32% and -7.01%, respectively. The marginal effect of age² on seafood preference level indicates that the more elderly the respondents are, the higher the likelihood of having high preference for seafood by 17.04%, moderate preference for seafood by 3.32% and low preference for seafood by 13.77% respectively.

Table 1. Ordered Probit Estimation Results of Factors Influencing Preference Level of Seafood Consumption in the Study Area

Variables	Coefficients	Wald Chi-square value	Marginal Effect		
			Prob (Z=1)	Prob (Z=2)	Prob (Z=3)
Sex of respondents	0.0078	0.3744	0.0448	0.0088	0.0360
Marital status	0.2856	1.2067	2.2222	0.0000	1.1111
Age of respondents (years)	0.3911	3.5567	0.1727	-0.0337	0.1390
Income	0.4911	4.7011**	0.0281	0.1159	0.1439
Household size	-0.5922	-9.8967**	0.0701	0.0132	0.0548
Age ²	0.4800	5.7611**	0.1377	0.0332	0.1704
Access to seafood within 1km – 4km	0.1311	6.0467**	0.1227	0.0281	0.1523
Level of education	0.0067	6.7778**	0.0275	0.1137	0.1413
Price of seafood	-0.5222	7.5456***	-0.0272	-0.1123	-0.1395
δ_1	1.3644	7.7122**			
δ_2	2.6344	27.1789**			
Chi-square	53.0132				
Log likelihood	-131.02*				
Prob.	0.010				
Degree of freedom	9				
Number of observed samples	300				

*Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

Source: Computed from Field Survey Data, 2020

Z=1 = Low preference level, Z=2 = Moderate preference level and Z=3 = High preference level

Table 2. Result of the Multinomial Logit Model on Factor Influencing the Choice of Seafood in the Study Area

Explanatory variables	Fillet	Calamari	Crabs	Lobsters	Grouper	Croaker
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)
Income	0.00001 (0.00002)	0.00006 (0.00005)	0.00046*** (0.00014)	-0.00012 (0.00016)	0.00012* (0.00012)	0.00014* (0.00006)
Sex of respondents	-0.292827 (0.37353)	0.27822 (0.30974)	0.37049 (0.46483)	1.30183 (0.79487)	0.18969 (0.34632)	0.57878 (0.38116)
Age of respondents	-0.27485 (0.54453)	7.23665 (981.87)	11.79938 (827.202)	10.29519 (1142.43)	0.58939 (0.52894)	0.30665 (0.54569)
Marital status	0.17127 (0.73469)	-0.54263 (0.63255)	-1.05059 (0.98815)	7.90616 (1304.0004)	-0.81246 (0.73808)	-0.96498 (0.6006)
Level of education	8.27313 (981.87)	7.68057 (981.87)	7.93756 (981.87)	0.2407 (1,788.541)	0.22627 (1,761.411)	0.22749** (0.03441)
Age ²	0.60881 (0.61619)	0.77126 (0.57611)	0.19844 (0.76600)	-0.10081 (0.97960)	0.17908* (0.07211)	0.68769* (0.0755)
Access to seafood within 1km – 4km	0.30466 (0.39062)	0.33269 (0.3205)	0.17474* (0.00924)	0.92736 (0.81015)	0.77612* (0.40198)	0.48485 (0.40025)
Price of seafood	0.45665 (0.47771)	0.13156 (0.35685)	0.57891 (0.77587)	-0.35791 (0.69693)	-0.07611 (0.40697)	0.62941 (0.50941)
Household size	0.39575 (0.40712)	-0.37061 (0.33861)	-0.82667 (0.50315)	0.48165 (0.62485)	-0.60124 (0.37345)	-0.13834** (0.03253)
Constant	10.99147	10.51637	-2.55097	-18.52393	-1.70973	9.69289
Diagnostics						
Base category	Shrimps					
Number of observations	300					
LR chi-square	96.89***					
Log likelihood	-312.0121					
Pseudo – R ²	0.1418					

Significance levels at 10%*, 5%** and 1%***
Source: Computed from Field Survey Data, 2020

Table 3. Marginal Effect of Factor Influencing Household Choice of Seafood in the Study Area

Explanatory variables	Crab Prob	Grouper Prob	Croaker Prob
Income	0.0689	0.1223	0.0985
Level of education			0.1201
Age ²		0.1170	
Access to seafood within 1km – 4km	0.1043	0.1295	
Household size			--0.1186

The Table shows that an increase in accessing seafood within 1km to 4km distance by the respondents in the study area increases the probability of the respondents having 15.23% high preference for seafood, 2.81% moderate preference for seafood and 12.27% low preference for seafood in the study area. The marginal effect of education on seafood preference level indicates that higher levels of education will increase the likelihood of having high preference for seafood by 14.13%, moderate preference for seafood by 11.37% and low preference for seafood by 2.75% respectively. Marginal increase in the price of seafood will probably lead to decrease in high preference (13.95%), moderate preference (11.23%) and low preference (2.72%).

3.3 Multinomial Logit Model (MNL) on Factors Inducing Household Choice of Seafood in the Study Area

The results of MNL model shows how socio-economic characteristics of the respondents influence household choice of seafood in the study area. The choice set in the MNL model included the following seafood: (a) fillet, (b) shrimps, (c) calamari, (d) crabs, (e) lobsters, (f) grouper, and (g) croaker which were the commonly consumed seafood in the study area. The MNL on seafood choice model showed some significant levels of the parameters estimates. Table 2 shows the results of the MNL Regression model. The likelihood ratio statistics as indicated by χ^2 statistics (96.89) are highly significant ($P < 0.0012$), suggesting that the model has a strong explanatory power.

In all cases, the estimated coefficients should be compared with the base category of shrimps. Moreover, the MNL is run with and without many explanatory variables (endogenous and exogenous variables), as they were in many studies such as Deressa *et al.*, (2009) and Gbetibouo (2009) while some were later dropped because of their insignificant effect on the parameters of the estimates. Table 2 presents

the MNL results along with the levels of statistical significance. The results indicated that income influenced the choice of household seafood preference. Income significantly increases the probability of the choice of crabs, grouper, and croaker compared to shrimp at 1%, 10% and 10% level of significance respectively in the study area. This study follows a-prior argument that indicates that households with more income are likely to take up expensive food such as crab, grouper, and croaker (Paulin, 2020). Crab, grouper, and croaker seafood are expensive compared to shrimps in the study area. Hence, the higher the income of the respondents, the higher their preference for the expensive seafood such as crab, grouper, and croaker. The level of household education has a positive and significant (5%) impact on the seafood choice. The result revealed that level of education influenced the choice of croaker fish compared to shrimp in the study area. This is likely because croaker fish is a rich source of protein; hence, the elite will prefer to consume it for that purpose. Likewise, age² would significantly (10% level of significance) increase the household choice of selecting grouper and croaker compared to shrimp in the study area. The older household will prefer grouper and croaker because they are succulent and highly nutritious.

Access to seafood with 1km to 4km would significantly (10% level of significance) increase the household choice of selecting crab and grouper compared to shrimp in the study area. The seafood consumer will prefer to buy crab and grouper if sold within an accessible distance of 1km to 4km compared to buying shrimp. This is in line with the findings of Seafood Health Finds (SHF) [17] that fish consumer will prefer buying within a walking distance because of perennial storage problem of preserving seafood in developing countries. Household size had a negatively significant (5%) impact on preference for croaker fish. This is in line with the findings of Agidew and Singh [18] that a larger household size above five which is the mean household size in the study area will deter consumption of

expensive food such as croaker fish compared to consumption of shrimp which is cheaper and will be affordable for a large household above five.

The marginal effect of multinomial logit model on factors inducing the choice of seafood consumption in the study area is shown in Table 3. This shows the effect of a unit change in the explanatory variables on the choice of seafood consumption with respect to the base category (shrimp) in the study area. The marginal effect for income indicates that a unit increase in income of the household will increase the likelihood of the choice of crab by 6.89%, grouper by 12.23% and croaker by 9.85% compared to shrimp by the respondents in the study area. An increase in the respondents' level of education in the study area will increase their choice of croaker by 12.01% compared to shrimp. While a unit increase in the age (above 60 years) of the respondents will lead to an increase in choice of grouper by 11.70% in the study area compared to shrimp. A unit increase in access to crab and grouper within one kilometer to four kilometers distance will increase their choice by 10.43% and 12.95% respectively compared to shrimp in the study area. In the study area, a unit increase in the household size above five, which is the mean household size in the study area, will lead to decrease in the choice of croaker by 11.86% compared to shrimp as shown in Table 3.

4. CONCLUSION

The study examined the factors influencing households' preference level for seafood and determined the factors inducing the choice of seafood consumption by households in Southwest Nigeria. The empirical results from the analysis revealed that the price of seafood, income, household size, age², access to seafood within 1km – 4km and level of education were critical variables influencing the preference level for seafood in the study area. The results of multinomial logit model indicated that income, level of household education, age², access to seafood with 1km to 4km, and household size induced the choice of household seafood preference in the study area.

Therefore, seafood marketers should take cognisance of the income distribution within a community to know their targeted customers. This will reduce their burden of looking for customers and trying to approach anybody to buy their products. Likewise, the marketers

should target senior citizens above 60 years in the study area, since age² is one of the critical variables influencing seafood preference level in the study area. Seafood marketers should ensure that their products are accessible within one kilometer to four kilometers for their customers to easily access their products. The marketers should target the elites in marketing their products. They are the class of people who prefer their products. In their door-to-door marketing of seafood in the study area, the seafood marketers should note that large household above five people may not prefer their products; hence, they should target small household size of less than five people in marketing their products.

Specifically, crab, grouper and croaker marketers should be sensitive to a positive change in income status of their customers, this will help them to know when and where they will sell more of their products (i.e., crab, grouper, and croaker). Additionally, croaker marketers should be sensitive to the educational status of their customers, knowing that the higher their educational status they more they will prefer marketers' products.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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