ACCESS TO ANIMAL SOURCE FOODS AND CONSUMERS' PREFERENCES IN PERI-URBAN AND URBAN AREAS OF IBADAN, NIGERIA

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ABSTRACT

Most discussions on the consumption of Animal Source Foods (ASFs) in urban areas focus on single ASF with attention on residents within and around the city centre, leaving out the transitional zones (peri-urban areas). This study was carried out in Ibadan, the capital city of Oyo State, Nigeria and one of the largest urban agglomerations in the country. Multi-stage sampling procedure was employed to obtain 228 consumers from both urban and peri-urban areas and data were collected using structured questionnaire and analyses done using percentages and regression statistics. The ranking of different ASFs in order of preference by respondents were influenced by factors such as personal tastes and culture. Beef had the highest frequency as the first choice ASF followed by fish in both urban and peri-urban areas. Majority (78.57 %) of respondents in urban and 68.97 % in peri-urban area had access to their most preferred ASF. Factors which significantly affect consumers' access to ASFs are price of ASFs, consumers' education, income per week, and income type (monthly or daily). Consumers who received monthly incomes were 18.6% in urban and 16.4 % in peri-urban area more likely to have access to ASFs. Those with a minimum of secondary education were 4.6 % more likely to have access to ASFs in peri-urban area. The price of ASFs in the urban area reduced the probability of access to ASFs by 3.90 %. Appropriate implementation of better income packages will help to improve consumers' access to their preferred ASFs.

Keywords: Animal protein, Consumer preferences, Peri-urban, Urbanization

INTRODUCTION

Nigerian urban population has been on the increase since independence and more rapidly since 2010 at an annual rate of 4.30 %. The proportion of total population in urban areas was 34.84 % in 2000 and increased to 51.16 % in 2019 (Avis, 2019). Nigeria has a few large urban agglomerations where urbanization is evidently taking place at a fast pace. The process of urbanization has brought about expansion of frontiers of cities leading to change in land use, livelihoods and socio-economic values. This process presents both opportunities and challenges (Abubakar and Dano, 2018) for urban residents, especially the low income poor. Most of the transformations are as a result of society dynamics which are concentrated in the peri-urban areas. The peri-urban area also referred to as peri-urban interface, rural-urban fringe or transition zone (Simon, 2008) is the space where the urban and rural sectors meet and has been described as a transition zone that is totally rural at one end and urban at the other (Birley and Lock, 1998). Much of urban growth has been identified to take place in peri-urban areas (Adam, 2020) and most of the population growth occurring is more significant in the peri-

urban areas. It is therefore crucial to include peri-urban research with urban research for a complete picture of urban issues. This generally has not been the case as most research studies focus exclusively either on urban (city centre) or rural area.

There have been a lot of discussions on consumption of animal protein in urban areas. These include Musa (2015) who investigated the consumption expenditure on animal protein by urban residents of Kaduna metropolis, Inyang *et al.* (2014) examined the factors which influence consumption of animal protein in urban Adamawa State, Nigeria, Ogunwole *et al.* (2014) examined consumers' preference and perception of chicken meat among staff and students of University of Ibadan, Ibadan, Nigeria and Amao and Ayantoye (2014) who studied consumer preference and consumption pattern of selected forms of fish in Oyo State, Nigeria. It has been observed that most reports on animal protein consumption in urban areas focus on single animal source food within and around the city centre, leaving out the transitional zones (peri-urban areas). Although food insecurity has been acknowledged as one of the major challenges of urbanization in Nigeria (Oyeleye, 2013), there is limited knowledge of poor urban residents' preference and access to food and nutritious diets (Tacoli, 2017).

Animal source foods (ASFs) are important high quality foods that provide proteins which in turn provide essential amino acids for the proper functioning of the human body systems. Proteins from animal source have been researched to contain all the essential amino acids in adequate quantities (BioTechFoods, 2021). In addition to the amino acids, ASFs also contain some minerals such as iron and zinc which are available in forms that are easily absorbed by the human body. Urban residents are generally not livestock producers, but purchase their livestock products from markets. Thus, access of these consumers to ASFs is very important for healthy life. These consumers are decision makers who purchase products or services primarily to meet their personal needs based on their preferences and access, irrespective of their residential location.

This study assesses consumers' preferences and accessibility of ASFs. It also determines their information needs on ASFs, and challenges/constraints associated with accessing ASFs in both peri-urban and urban areas of the study area. The results from this study will be useful to all stakeholders involved in ASFs value chain. Stakeholders will be better equipped to meet needs related to ASFs and thus contribute to food and nutrition security and improved livelihoods.

MATERIALS AND METHODS

The study area was Ibadan ($7^0$23'N $3^0$55'E), the capital city of Oyo State, Nigeria. It is one of the largest urban agglomerations in the country. Located in Southwestern Nigeria, Ibadan covers a total area of about 3,080 square kilometers (NPC, 2006). Administratively, Ibadan metropolitan area is made up of eleven Local Government Areas (LGAs), five of which are urban and six peri-urban (Adelekan *et al.*, 2014). According to (NPC, 2006), Ibadan Southwest LGA had the highest population growth rate of 1.60 % in urban Ibadan between 1991 and 2006, while Egbeda and Lagelu LGAs ranked second and third respectively for the peri-urban zone of Ibadan within the same period. It is against this backdrop that these LGAs were selected for the study.

This study employed the use of multi-stage sampling procedure to obtain a total of 228 consumers who were selected from three LGAs (Ibadan Southwest, Egbeda and Lagelu) representing urban, peri-urban and peri-urban respectively. Personal interview schedules were conducted with the use of structured questionnaire to obtain information on household size, educational level, income per month, distance from home to point of ASF purchase and most preferred ASF, from the two hundred and twenty eight (228) respondents (112 from urban and 116 from peri-urban). The questionnaire was face validated, pretested, and tested for reliability before administration (Roopa and Rani, 2012).

Data Analysis: Descriptive statistics (percentages) and binary choice model were

employed in the analyses of data collected. T-test was employed to test the significance between urban and peri-urban preferences for ASFs.

Binary Choice Model (Probit Model): Following Greene (2008), $Pr(y_i = 1/x_i) = F(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \text{------} \beta_n x_n) = Pr(y_i = 1/x_i) = F(x\beta)$, where F is a function which takes on value strictly between zero and one. That is, $0 < F(z) < 1$ for all real numbers z. $0 < F(z) < 1$ can be referred to as an index model since $Pr(y_i = 1/x_i)$ is a function of the vector x only through the index: $x\beta = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \text{------} \beta_n x_n$ which is simply a scalar. $0 < F(x\beta) < 1$ ensures that the estimated response probabilities stay strictly between zero and one. F is a cumulative density function which normally increases monotonically in the index z, that is, $x\beta$ with $Pr(y_i = 1/x_i) \rightarrow 1$ as $x\beta \rightarrow \infty$ or $Pr(y_i = 1/x_i) \rightarrow 0$ as $x\beta \rightarrow -\infty$. In the Probit model, F is the standard normal cumulative density function expressed as an integral: $F(x\beta) = \phi(x\beta) \equiv \int_{-\infty}^{x\beta} \phi(v) \, dv$. F ensures that the probability of 'success' is strictly between zero and one for all values of the parameters and the explanatory variables. Probit regression analysis was used to examine the effect of some factors on consumers' access to ASFs. The binary choice in this study is if the consumers have access to ASFs or not. Therefore, Y = 1 if consumer has access to ASFs and Y = 0 if otherwise.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of Respondents: Mean age of respondents was 36.63 ± 0.03 years in urban and 35.18 ± 0.21 years in peri-urban area. Average household size was 5 ± 0.01 in both urban and peri-urban areas. More than 70 % were married and more than 80 % had a minimum of secondary education in both urban and peri-urban areas (Table 1). These corroborated the findings of Idiaye *et al.* (2020), which posited that most consumers of ASFs have high educational attainment which exposed them to the importance of consuming ASFs for healthy living.

Consumer Preferences: These are subjective of individual tastes, as measured by consumers satisfaction derived from consuming a good when compared to other goods (Salazar-Ordonez and Rodriguez-Entrena, 2019). Consumers usually have preferences for a particular product but may not have a purchasing power for it, and thus have restricted access to the product (Akinwumi *et al,* 2011). They also have a set of preferences which are dependent on personal tastes, culture, education and other array of factors (Salazar-Ordonez and Rodriguez-Entrena, 2019).

These consumers make decisions by allocating their scarce income to all possible goods in order to obtain the greatest satisfaction. However, it is important that they have unrestricted access to nutritious foods, an essential component of food security (Fafiolu and Alabi, 2020). Table 2 showed the respondents' preference rankings for different ASFs. It is important to note however that a consumer may not necessarily purchase and consume his/her preferred product as a result of several factors which may be cultural, economic and/or environmental.

Beef was ranked as the most preferred ASF by 46.43 % of the respondents in the urban area but more than half (58.62 %) of respondents in peri-urban area. This was similar to the finding of Adetunji and Rauf (2012) who found that the most preferred meat in Southwest Nigeria was beef. Also, Alimi (2013) noted that beef was the most preferred meat in Akungba-Akoko, Southwest Nigeria.

Second in position to the first choice ASF was fish in both urban and peri-urban areas. None of the urban respondents ranked pork, chevon, mutton or turkey as first choice ASF. It is interesting to note also that none of the peri-urban respondents ranked chicken as a first choice ASF. This also applied to eggs, pork, chevon, mutton and snail for the peri-urban residents. Reasons given for the preference ranking structure of ASFs by respondents included availability of ASFs, environment, disposable income, personal taste, religion and culture.

Table 1: Demography and socioeconomic characteristics of animal source foods (ASFs) consumers in peri-urban and urban areas of Ibadan, Nigeria

Variables	Urban Area		Peri-urban Area	
	Frequency	%	Frequency	%
Age 20-29	20	17.86	32	27.59
30-59	84	75.00	80	68.96
60 and above	8	7.14	4	3.45
Sex				
Female	88	78.57	64	55.17
Male	24	21.43	52	44.83
Marital status				
Single	12	10.71	32	27.59
Married	96	85.71	84	72.41
Widow	4	3.57	0	0.00
Educational level				
None	12	10.71	8	6.90
Primary	8	7.14	4	3.45
Secondary	64	57.14	48	41.38
Tertiary	28	25.00	56	48.28
Type of income				
Daily	88	78.57	64	55.17
Weekly	0	0.00	4	3.45
Fortnightly	0	0.00	8	6.90
Monthly	24	21.43	40	34.48

Table 2: Percentage ranking of consumers' preference for animal source foods (ASFs) in peri-urban and urban areas of Ibadan, Nigeria

Rank	Animal source foods (ASFs)	Percentage ranking of consumers preference of ASFs	
		Urban (%)	Peri-urban (%)
1st	Meat	46.43	58.62*
2nd	Fish	39.29	37.93
3rd	Eggs	25.00	24.14
4th	Milk	28.57*	13.79
5th	Fish	14.29*	6.89
6th	Chicken	10.71	13.79*
7th	Beef	7.14	13.79*
8th	Turkey	0.00	13.79*
9th	Pork	3.57	3.45
10th	Snail	0.00	3.45*
11th	Mutton	0.00	3.45
12th	Chevon	0.00	0.00

• *Significant ASF along row at p<0.05 using pairwise test*

This corroborates the finding of Akinwumi *et al.* (2011) that availability and taste were factors which affect consumers' preference and purchase of ASFs. Akinwumi *et al.* (2011) also found that majority of consumers preferred chicken but consumed more of beef because the latter was more affordable and available.

More respondents in both urban and peri-urban areas ranked chicken meat and eggs as third choice ASF (Table 2).

Pork was not ranked as first choice ASF in both urban and peri-urban areas. Reasons reported by respondents were cultural and religious. In a related study by Okunlola *et al.* (2011), pork was ranked fifth by consumers of ASFs in Southwest Nigeria, while Nkang and Effiong (2015) reported that the consumption of pork in the south-south part of Nigeria was not significantly influenced by religion. Consumers in this study gave reason for their low ranking of pork, while reason was not explicitly stated in Okunlola *et al.* (2011).

Access to ASFs: With regards to purchasing and consumption, that is, access to the most preferred ASF, 21.43% of the respondents in urban and 31.03% in peri-urban area did not consume their most preferred ASFs but opted for alternatives which they could conveniently afford and have access to. This implies that 78.57% of respondents in urban and 68.97 % in peri-urban area had access to their most preferred ASF.

A large proportion of the respondents (89.29 %) purchased ASFs from food markets

which were at an average distance of 3.62 km from home. Others purchased their ASFs from farms, abattoirs and retail hawkers. This implies that these consumers of ASFs are not producers of what they consume, but rather purchase what they consume.

Consumers' Probability of Having Access to ASFs: Considering results of the Probit regression analysis, factor which–had negative significant effect on consumers' probability of having access to ASFs in the urban area is the price of ASFs (Table 3). The higher the price of ASFs, the lower the probability of the consumers having access to ASFs. The distance between the point of purchase of ASFs and the home had negative but not significant effect on the probability of consumers' access to ASFs. This finding was at variance with the findings of Akinwumi *et al.* (2011), Alemu *et al.* (2017) and Udomkun *et al.* (2018) who stated that proximity of place of sales was one the factors that influence consumers' accessibility and preferences for ASFs.

Type of income (daily, fortnightly or monthly) and amount of income per week had positive and significant effects on the probability that consumers will have access to their preferred ASFs. An increase in the amount of income per week will increase the probability of access to ASFs by 0.14 or 14.00 % (Table 3). In addition, as consumers' income transit from daily to monthly payment, the probability of access to ASFs increases by 0.19 or 19.00 %. Income is an important factor that provides consumers with the necessary purchasing power to obtain desired goods. Increase in income has been noted to be crucial in raising the consumption of ASFs by consumers (Akerele *et al.,* 2018).

In the peri-urban area, access to ASFs was affected positively and significantly by consumers' education, income per week and income type. The higher the level of education of the consumer, the higher the probability of his/her access to ASF.

This was in line with Idiaye *et al.* (2020) who indicated a positive relationship between education and consumption of ASFs. The importance of ASFs to healthy life is understood and appreciated through education.

The income types in the study area were daily, weekly, fortnightly and monthly incomes. The more a consumer's income shifted away from daily towards monthly income, the higher the probability of access to ASFs. That is, consumers with fortnightly and monthly incomes had a higher probability of access than those with daily income. The higher the income of consumers, the higher the probability of their access to ASFs since there will be more cash available at the consumers' disposal for the purchase of ASFs. The findings of this study was in agreement with the findings of Musa (2015) and Akerele *et al.* (2018) that reported strong relationship between consumers' income, purchasing power and their level of ASF consumption.

Constraints to Unrestricted Access of Consumers to ASFs: The consumers of ASFs in this study had challenges in unlimited access to their preferred ASFs with regards to high prices of all ASFs. This was reported to affect their access to these foods, thus limiting the frequency of purchase and consumption as well as the quantity consumed. This corroborated the finding of Musa *et al.* (2011) that price as an important factor which affected consumers' preferences and purchasing behavior.

Low Personal Incomes: Incomes were regarded as low leading to low purchasing power. As a result, consumers have to rank their preferences and allocate their limited income in such a way as to get the possible maximum satisfaction. Thus, in many cases, consumers purchase ASFs that they can afford and not necessarily their preferred choice. In this regard, Adeniyi *et al.* (2012) reported a significant relationship between consumers' disposable income and their expenditure on ASF. Musa (2015) also asserted that the low income level of consumers was a constraint to the consumption of ASFs.

Table 3: Estimates from Probit regression analysis of factors which influence consumers' access to animal source foods (ASFs) in peri-urban and urban areas of Ibadan, Nigeria

Variables	Urban			Peri-urban		
	coefficient	Z	P>(z)	coefficient	Z	P>(z)
X_1	0.02	0.83	0.41	0.89	1.59	0.11
X_2	0.04	1.44	0.15	0.05	1.66*	0.10
X_3	-0.03	-0.65	0.52	-0.02	-0.94	0.35
X_4	0.00	0.17	0.86	0.00	0.47	0.64
X_5	0.19	2.47***	0.01	0.16	2.09**	0.04
X_6	0.14	2.18**	0.03	0.17	2.55***	0.01
X_7	-0.04	-1.67*	0.10	-0.15	-0.82	0.41
X_8	0.11	1.15	0.25	0.10	0.70	0.49
X_9	-0.84	-1.57	0.12	-0.04	-0.70	0.48
	Prob >Chi^2 = 0.01			Prob >Chi^2 = 0.02		

*significant at 10%, **significant at 5%, ***significant at 1%, X_1= sex, X_2= education level, X_3= household size, X_4= number of children below 18 years old, X_5= type of income, X_6= income per week, X_7= average cost of ASF, X_8= source of ASF, X_9= distance between home and point of ASF purchase

Lack of Information in Relation to Availability of Some ASFs: Some consumers reported the lack of information regarding where and how to obtain certain ASFs such as snails, chevon and mutton, indicating that these were not readily available. This supports the finding of Paul and Rana (2012) that food availability positively affects consumers' intention to purchase such food.

Seasonality of Certain ASFs: Snail was particularly reported to be very seasonal in availability. Prices were also reported to be high when they are available. Availability is one of the major factors which influence consumers' preference and decision to purchase ASFs (Akinwumi *et al.,* 2011).

Conclusion: Consumers in this study were not producers of livestock, but people who purchase their ASFs mostly from the market. This presents a huge opportunity for practicing and prospective livestock farmers as well as other entrepreneurs to invest in the livestock industry and thus help contribute towards the attainment of Sustainable Development Goals (SDGs) 2, 3 and 8. These SDGs addresses issues such as zero hunger, good health and wellbeing, decent work and economic growth. The low rankings of snail, chevon and mutton by the respondents are indications of lack of information and accessibility to these ASFs in the study area.

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