DETERMINANTS OF QUAIL EGGS CONSUMPTION IN KWARA STATE, NIGERIA

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ABSTRACT

This study was carried out to determine the consumption pattern and preference for quail eggs by consumers in Nigeria and also to determine the factors affecting quail eggs consumption in Nigeria. Area of study was Kwara State and data used for the study was collected from one hundred and twenty urban dwellers using a three-stage random sampling technique. Analytical tools include descriptive statistics and binary logistic regression model. The study revealed that consumers prefer the big sized quail eggs with light yellow yolk colour, having thick, white shell. 74.1% of quail egg consumers prefer the boiled form. The logistic model explains 88.3% of the consumer's willingness to pay for quail eggs for their consumption and at 5% significance level, the consumer's awareness of the various health benefits of quail eggs was statistically significant. This study recommends that quail farming should be boosted while Nigerians should be sensitized on the health benefits of quail products, even considering that this can play immense role in food security in Nigeria Also, jobs should be created along the value chain of quail production thereby reducing the unemployment level in the country. Increasing the level of quail production will also serve as a diversification strategy to mitigate risk in poultry production as chicken production is still the most prominent on the industry while other birds are relegated despite the abundant opportunities therein. The study also suggests researchers should work on genetically breeding quail species that produces eggs with the preferred characteristics by consumer in other to place quail eggs such as to be able to compete favourably with chicken eggs which has the highest level of acceptance in Nigerian egg market currently.

Key words: Binary logistic regression, Eggs, Quail, Kwara state

Introduction

'The poultry industry in Nigeria occupies a unique position in the livestock sector' (Obioha, 1992). This sector possesses the greatest potential for bridging the protein supply gap because of its short generation interval, high turnover rate and reproductive efficiency compared to other livestock. Poultry industry in Nigeria is of high importance as this is one of the commonest sectors of agriculture considering the fact that large number of people keep local chickens on a subsistent basis in which these chickens are raised for consumption and in several instances given as gifts. As a matter of fact, certain parts of Nigeria, like the yorubas has the culture that see to elders raising chickens on behalf of children in the household, this is most common in the rural communities. From the food security point of view, poultry industry is of essence being a major supplier of animal protein and putting into consideration the fact that food security line has been benchmarked by Olayide (1982) at the availability and accessibility of individuals to 2, 260Kcal and 65g protein per day.

'Generally, the attention of producers has been integrally glued to chicken with minimal attention paid to other poultry species' (Monsi, 1994). 'Out of the poultry species in Nigeria, the local chickens constitute 69% of the total poultry production' (FLDPCS, 1991). 'Nigeria is endowed with an impressive array of domestic livestock. The dominant species include chickens (estimated population 160 million), Guinea fowl (8.3 million) Ducks (1.7 million), and Turkey (0.7 million)' (Apantaku *et al.*, 1998). Asides chicken, other avians such as turkeys, guinea fowls, ducks and pigeons equally have potentials in contributing more to the available meat supplies especially if better attention is given to rearing them on a scale larger than the current level.

'The potential of local poultry cannot be overlooked considering the huge foreign exchange implication of the importation of improved exotic stock' (Ibe, 1990) and also 'genotype-environment interaction which leads to considerable loss of fitness of the exotic stock' (Oluyemi and Oyenuga, 1971).

'Quail farming as an alternative poultry enterprise has only recently been introduced into Nigeria, where it is reared for its excellent meat and egg characteristics due to its numerous nutritive and economic benefits' (Odugbo, 2004). Quail meat and egg are renowned for the high quality protein and biological value and low calorific content. Past studies on quail eggs have proven them to be one of the best known natural treatment products which the Chinese medical practitioners have used for centuries and recorded brilliant results. As quail eggs are slowly becoming an easy to get product on the market more and more people are beginning to show interest in their use as an active natural medicine instead of the chemical products with so many side effects. (Slowsprings farm 2013)

'Poultry meat and eggs offer considerable potentials for bridging the protein gap, because high yielding exotic poultry adapt easily to the tropical environment and the technology of production is relatively simple with returns on investment appreciably high' (Ekenyem and Madubuike, 2006).

Quail are small game birds that are used for eggs and meat (DAFF, 2009). Quail eggs have a history dating as far back as two thousand years and are considered a delicacy in many countries including Western Europe and North America, Japan, China etc. (Wikipedia, 2008). Quail eggs have no known contraindications and have proven to be a truly beneficial cure for quite a number of ailments. Likewise, the nutritional content of quail eggs has been demonstrated to be higher than that of its chicken counterpart. In comparison, the quail egg contains five times more phosphorus, 7.5 times more iron, 15 times more vitamin B2 and six times more vitamin B1. Quail eggs also contain calcium, zinc, sulfur, potassium and have high HDL cholesterol content. The eggs are excellent for revitalizing the body at any age, have a beneficial effect in the postnatal period, after surgery and radiotherapy, in cases of anemia, spasmophilia, headaches and nervous fatigue. (bright healing,2011 ; Living healthy 2012)

Quail eggs are very delicious and comparable in taste to free-range chicken eggs. According to Tunsaringkarn et al (2013), 'their nutritional value is 3 – 4 times higher than that of chicken eggs. Quail eggs contain 13% protein while chicken eggs have about 11%. Quail eggs have 140µg of vitamin B1,

compared to 50µg in chicken eggs. Quail eggs are rich in choline, a chemical essential for brain function'. According to Trautman (2012), quail eggs strengthens the immune system, promote memory health,increase brain activities and stabilize the nervous system while they also help with anaemia by increasing the level of haemoglobin in the body while removing toxins and heavy metals. Various literatures reviewed such as researches carried out by Ye et al(1999), Lalwani(2011),Squidoo(2012) suggest that quail eggs have been noted to: remove toxins and heavy metals from the blood, have strong anti-cancer effects, help inhibit cancerous growth, nourish the prostate gland and restore sexual potency in men, enhance good memory and brain activity, strengthen the immune system, slow down aging process, strengthen heart muscle, reduce risk/alleviate symptoms of alzheimer's disease, strengthen hair, enhance the skin, boost children's immune system against infectious diseases, heal gastritis, stomach ulcers, prevents anaemia, maintains vital organs etc. Lalwani (2011) reported that the nutritional value of quail eggs is much higher than those offered by other eggs and are rich sources of antioxidants, minerals and vitamins and give better nutrition than other foods.

'Commercialization of quail bird production is a recent development in Nigeria'. (Akpan and Nsa,2009). In the Nigerian poultry industry, quail egg production is negligible when compared to chicken egg production and this is attributable to the fact that chicken eggs have wider acceptability by egg consumers in the country. However, in recent times, there has been an upward trend in the awareness of beneficial use of quail eggs.

According to Cunha (2009), 'the poultry sector does not seem to be experiencing any substantial and sustained growth, despite attractive marketing features of meat'. Igado and Aina (2010) reported that most of the developing countries are presently at a stage of perpetual protein hunger. Poultry meat and eggs though the major source of animal protein is still unable to met the protein hunger of the world.

Quail egg consumption in Nigeria is still low compared to some Asian countries such as Japan, China etc where quail eggs are being used more as health products for combating various ailments and diseases. In order to

promote quail egg consumption in Nigeria, there is a need to understand what the customer's preference for quail eggs is. 'In order to know and meet the consumers' need, evaluation of the consumer preference is necessary and important' (Ayinde et al, 2010).

This study is carried out to determine the consumption pattern and preference for quail eggs by consumers in Nigeria and also to determine the factors affecting quail eggs consumption in Nigeria. This study is highly relevant as quail egg has been identified to have high nutritional value, also considering the fact that the high protein content of quail eggs is an avenue to explore to improve the food security status of that portion of the Nigerian populace falling short of the 65g per day index of the food security line.

Also, Successful producers know that consumers are the key to the economic viability and growth and that consumer preference drive the evolution of the industry (USDA's economic research service, 2003). Onyewuchi et al (2013) carried out a study and reported that quail meat and egg production is a profitable business going by the gross margin and net income value realized from sales of both quail meat and eggs, however production is still very low.

Hence this study will help identify those qualities preferred by consumers which if factored into production will invariably lead to an improvement in quail egg products, increased income which will translate into improved standard of living of the quail farmers in Nigeria.

Methodology

This research was carried out in Kwara state of Nigeria which consists of 16 Local Government Areas. The 2008 National population census placed the population of Kwara state at 2.37million people of which about 70% are into farming on a subsistent basis. Agriculture is the mainstay of the economy in Kwara state. This study engaged a three-stage sampling technique with the first stage being the purposive selection of Ilorin City being the major city in the State, with a populace cutting across various fields of life which constitute the sampling frame. The next stage was a stratified random sampling in which the population was divided into two (2) strata which are

Consumers of quail eggs and non consumers of quail eggs. The third stage involved the random selection of 60 respondents from each stratum to make a total of 120 respondents. Primary and secondary data were used for the study. The primary data were collected by the use of interview schedule to gather information on consumption of quail eggs , consumer preferences etc. The secondary data were obtained from the internet, text books, journal, and other published materials.

The methods of data analysis used include descriptive statistics and regression analysis. The descriptive statistics used to analyse the socio-economic data includes frequencies, percentages, graphs and charts. Binary Logistic regression was used to examine the determinants of consumer's willingness to pay for quail eggs.

This function is expressed as: $Y= \beta X_i+e$

$Y = \beta X_1+\beta X_2+\beta X_3+\beta X_4+\beta X_5+e$

Where, Y which is a dichotomous response variable (1 for consumers that are willing to pay and 0 otherwise), X_1 =monthly income, X_2 =awareness of health benefits,X_3=amount spent on other protein sources ,X_4=consumer's perception of quail egg availability,X_5 =cost of quail egg

Results and Discussion

Results on Socioeconomic Characteristics

Table 1: Socio-economic characteristics of sample consumers of quail eggs

	Category	Frequency	Percentages
Sex	Male	37	61.7
	Female	23	38.3
	Total	**60**	**100**
Age (in years)	11-20	6	10.0
	21-30	23	38.3
	31-40	6	10.0
	41-50	18	30.0
	>50	7	11.7
	Total	**60**	**100.0**
Marital Status	Single	27	45.0
	Married	33	55.0

	Divorced	-	-
	Widow	-	-
	Total	**60**	**100**
Educ. Status	Primary education	-	
	Secondary education	5	8.3
	Tertiary education	53	88.4
	Adult education	-	
	Quaranic education	-	
	No formal education	2	3.3
	Total	**60**	**100**
Monthly Income	≤ ₦100,000	42	70
	₦ 100,001 - ₦200,000	11	18.3
	₦ 200,001 – ₦ 300,000	3	5
	₦ 300,001 – ₦ 400,000	2	3.3
	₦ 400,001 – ₦ 500,000	1	1.7
	>₦ 500,000	1	1.7
	Total	**60**	**100**
Household Size	1-3	9	15.0
	4-6	35	58.3
	7-9	12	20.0
	10-12	4	6.7
	Total	**60**	**100.0**

Source: Field survey, 2013

Table 2: Socio-economic characteristics of sample non-consumers of quail eggs

	Category	**Frequency**	**Percentages**
Sex	Male	33	55.0
	Female	27	45.0
	Total	60	100.0
Age	11-20	9	15.0
	21-30	26	43.3
	31-40	19	31.7
	41-50	5	8.3
	>50	1	1.7
	Total	60	100.0
Marital Status	Single	34	56.7
	Married	25	41.7
	Divorced	-	

	Widow	1	1.6
	Total	60	100
Educ. Status	Primary education	-	
	Secondary education	1	1.7
	Tertiary education	57	95.0
	Adult education	-	
	Quaranic education	-	
	No formal education	2	3.3
	Total	60	100
Monthly income	≤ ₦100,000	52	86.7
	₦ 100,001 - ₦200,000	3	5
	₦ 200,001 – ₦ 300,000	1	1.7
	₦ 300,001 – ₦ 400,000	1	1.7
	₦ 400,001 – ₦ 500,000	1	1.7
	>₦ 500,000	2	3.3
	Total	60	100
Household size	1-3	8	13.3
	4-6	40	66.7
	7-9	11	18.3
	10-12	1	1.7
	Total	60	100.0

Source: Field survey, 2013

Some of the socioeconomic characteristics of the respondents considered includes: gender, age, marital status, educational status, monthly income and household size. Tables 1 and 2 present the distribution of the respondents based on their socioeconomic chracteristics. Results from the tablerevealed that the percentage of quail egg consumers that were male was about 61.7% while the female that consumed quail eggs were 38.3% which is far lower when compared to the male consumers which is similar to the findings of Bakoji et al (2013) which showed that more male were aware of the quail eggs. For non-consumer of quail eggs, 55% were male and 45% were female. The study revealed that a larger percentage of quail egg consumers in Kwara State were male. Some similarities may be drawn from this study and previous study on quail egg producers carried by Bakoji et al (2013) which revealed that quail egg production was predominated by male, this

could mean that males are more aware of the benefits hence venture into the production and by extension consume the products than females in the society.

For the quail egg consumer, Table 1 reveals that most of the respondents lie between the age range of the 21-30 with a percentage of 38.3% followed by age range 41-50 with a corresponding percentage of 30. About 43.3% of the non-consumers falls within the 21-30 age range and this is followed by the 31-40 age range with about 31.7%. From table 2, the least observed non-consumers of quail eggs falls within the above 50 age range with 1.7%. The sudy revealed that majority of the quail egg consumers were those people who were just reaching their active ages and those they were getting older. This may be attributed to the fact that those people were more aware of the quail egg benefits and/or they had more influence from their peers who were knowledgeable of the benefits.

For the consumer, 55% of the respondents were married and while 56.7% of the respondents that were non consumer of quail eggs were single. This implies that majority of the consumers were married and this may be explained by the fact that married individuals may influence other family members to also consume quail eggs.
For consumer, the results revealed that 88.8% of the respondents that were quail eggs consumers had tertiary education. This may be attributed to the fact that the study was carried out in the state capital where majority of the urban populace were civil servants and having higher education and these set of people were also willing to respond to the research upon administering questionnaires. In tangent with the work of Bakoji et al (2013) which revealed that 73.33% of quail eggs producers had tertiary level of education, one can deduce that the educational level of individual had large influence on the awareness of the benefits of quail eggs and definitely on their choice to consume or not. Moreso, individuals producers that have tertiary education may influence others in their categories on the decision to consume which may account for the higher number of respondents who were consumers in the category.

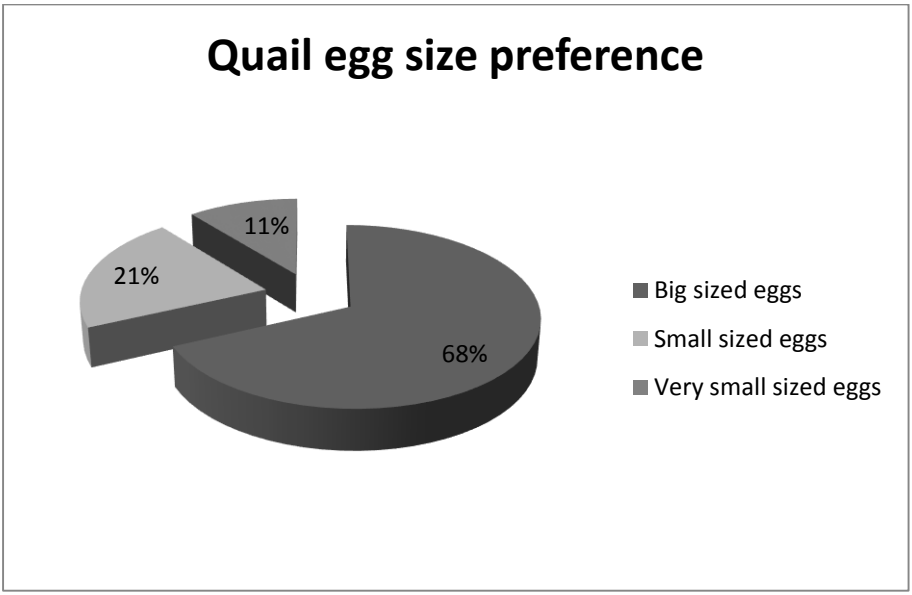
Findings from the research revealed that 70% of the respondents who were quail egg consumers earned monthly income that ranged from ₦100,000 (One hundred thousand Naira) and below. Likewise, 86.7% of the respondents also earn income within the same range. This may be explained by the fact that majority of the respondents earn income in that range. The result of consumers and non-consumers in terms of income indicated that the choice to consume quail eggs may have to do more with awareness rather than the monthly income level. This can be further buttressed by the result revealing that 3.3% of the quail egg non- consumers earn income in excess of ₦ 500,000 and yet do not consume quail eggs.

The study revealed that household size range of 4-6 has the highest percentage as 58.8% of quail egg consumers fall within household in that category. Likewise, 66.7% of non-consumers fall within that same household size range. The household size range of 10-12 individuals has the least number of respondents and the percentages were 6.7 and 1.7 respectively for quail egg consumers and non-consumers. It may be suggested that quail eggs purchases for consumption by the larger-sized households may be a bit challenging due to financial constraints hence the least percentage of respondents in the consumers category.

3.2 Evaluation Of Consumer Preference For Quail Eggs Characteristics

EGG SIZE: The research revealed that 67.2% of quail egg consumers had preference for big sized eggs, while 20.7% preferred the small sized eggs and 10.7%, the very small eggs. This is depicted by the chart in Figure 1.

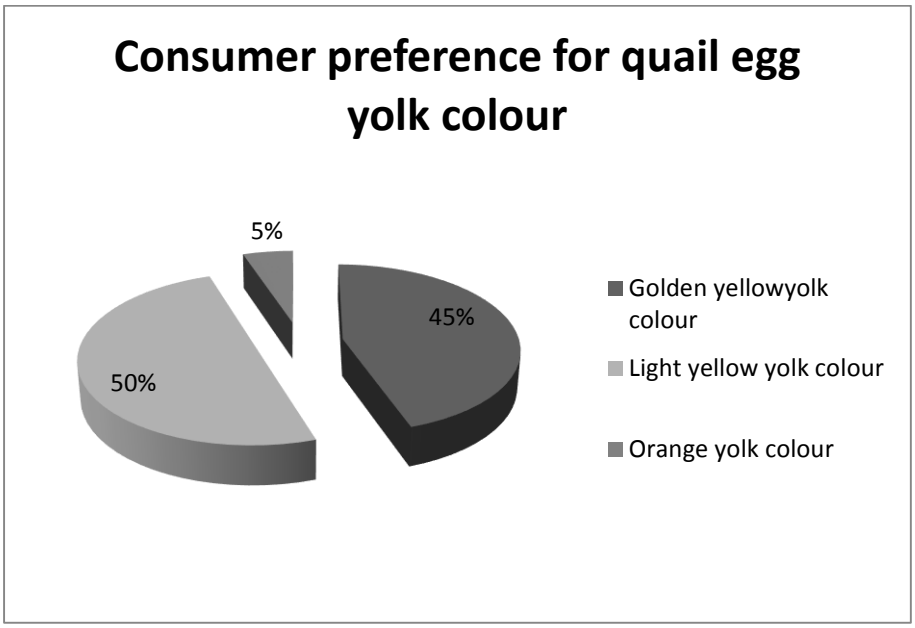
Figure 1.Consumer preference for the size of the egg



Source: Field survey, 2013.

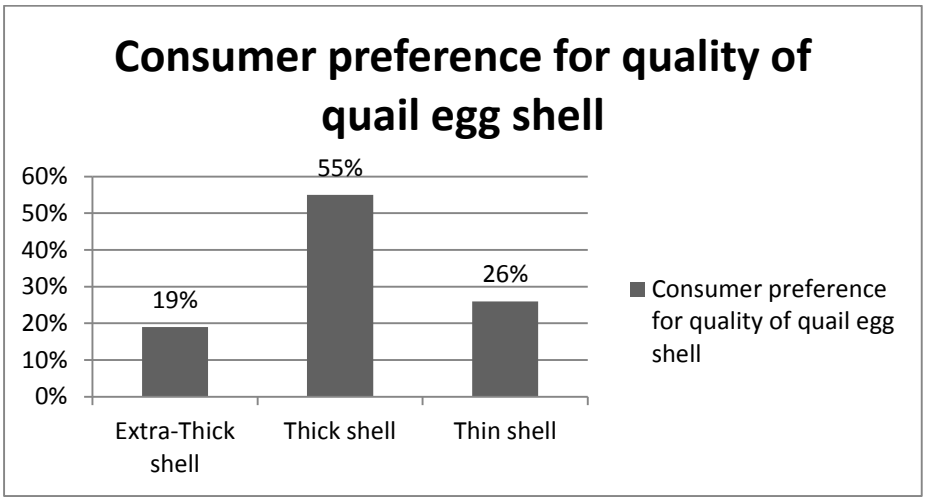
YOLK COLOUR: As shown in figure 2, the research revealed that 50% of quail eggs consumers preferred light yellow yolk colour while 44.8% of the consumers preferred the golden yellow yolk colour and only 5.2% of the consumer respondents preferred the orange yolk coloured quail eggs. The light yellow and golden yellow colour egg yolks that were prefered by 94.8% of the respondent could be accounted for by the fact that those colours are similar to what is obtainable in chicken eggs which has wide acceptability and are more commonly consumed.

Figure 2. Consumer preference for quail egg yolk colour



Source: Field survey, 2013.

Figure 3. Consumer preference for quail egg shell quality

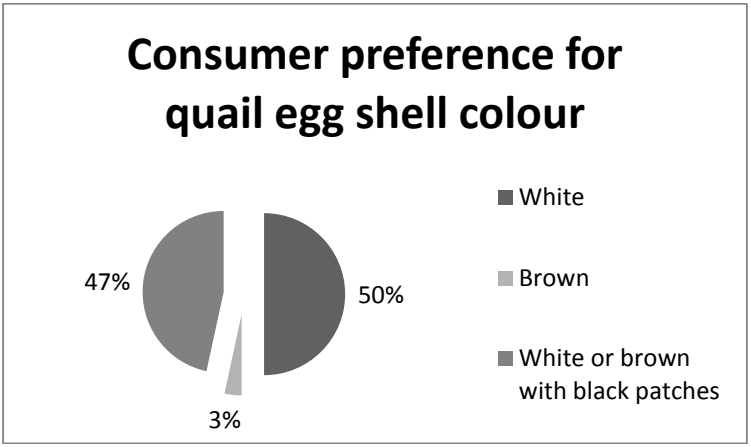


Source: Field survey, 2013

EGG SHELL QUALITY: Figure 3 indicates the research findings on egg shell preference by the respondents. The research revealed that 55% of the quail egg consumers preferred the thick-shelled eggs while 25.8% preferred eggs with thin shells. However, 19% preferred the extra-thick shelled eggs as they suggested that the thick and extra-thick shelled eggs are safer to transport on purchase.

EGG SHELL COLOUR: The research revealed that 50% of quail egg consumers had a preference for eggs with white shell colour. 46.6% however preferred the traditional brown or white eggs that have black patches on the shells. However 3.4% of the respondent showed preference for eggs with brown coloured shell. This is illustrated by the chart in Figure 4.

Figure 4. Consumer preference for quail egg shell colour



Source: Field survey, 2013.

3.3 Evaluation of Quail Egg Consumption Pattern In The Study Area

The research revealed that 74.1% of the respondents preferred boiled quail eggs, 15.5% preferred fried eggs while 10.4% preferred raw eggs. Majority of these consumers were aware of the health benefits of quail eggs and as such intentionally include it as a part of their diet. The number of respondents that consumed quail eggs in boiled form suggest that majority prefer the eggs in such form and may be more willing to purchase in the event of availability and accessibility to fresh boiled quail eggs.

The pattern of consumption of quail egg in the study is such that 58.3% of the respondent indicated that they consumed quail eggs at least once in every month. About 23.3% of the respondents consumed quail eggs on a weekly basis while 16.7% consumed minimum of one quail egg per day. 1.7% of the respondents are quail egg consumers who do not have a specific pattern in which they consume, in other words they consumed quail eggs whenever they are opportune to get them as they would not go extra mile to purchase the eggs and hence seldom consume the eggs.

3.4 Determinants Of Quail Egg Consumption

To identify the determinants of quail egg consumption in this study, binary logistic regression model was used. Table 3 shows the summary of the regression results.

Table 3.**Parameter estimate for the Logistic Regression Model**

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	X1	.001	.011	.014	1	.906	1.001
	X2	3.487	1.024	11.588	1	.001	32.686
	X3	.013	.116	.013	1	.909	1.013
	X4	-.195	.837	.054	1	.816	.823
	X5	-2.782	3.492	.635	1	.426	.062
	Constant	-.417	2.441	.029	1	.864	.659

Variable(s) entered on step 1: X_1, X_2, X_3, X_4, X_5

a. Overall case correctly predicted 88.3%
b. Model Chi-square 50.93

Table 3 reveal that the logistic model explains 88.3% of the consumer's willingness to pay for quail eggs for their consumption. At 5% significance level, X_2, the consumer's awareness of the various benefits of quail eggs is statistically significant while the monthly income, price of quail eggs, amount spent on other proteinous food products and quail eggs availability were statistically insignificant.

Exp(β) statistic implies that the odds in favour of consumer's willingness to pay for quail eggs for consumption increased by a factor of 32.686 in case of consumer's awareness of the health benefits of quail eggs. Hence if the level of awareness of quail eggs benefits can be increased, people will tend to consume more of the products and this will definitely improve the malnutrition and undernutrition reported by FAO (1990) to be affecting all age groups in Nigeria. Also, the monthly income of individuals and the amount spent on other proteinous food sources also increased the odds of consumer's willingness to pay for quail eggs by factors of 1.001 and 1.013 respectively. It is pertinent that the consumption of quail eggs be improved on as it is one more means of alleviating the protein deficit identified by

Ikheloa and Ihedia (2005) in their study in which Nigeria was identified as one of the countries that ranked amongst the least consumer of animal protein in the world. From the table 3, It is also shown that the odds of consumer's willingness to pay for quail eggs reduced by a factor of 0.823 in the case of consumer's perception of quail egg availability and 0.062 in the case of cost of quail eggs. Increasing the awareness of quail eggs benefit, availability and accessibility will improve the peopl's perception and hence raise their willingness to consume the products.

Conclusion and Recommendations

Quail egg consumption in Kwara state still lags behind when compared to chicken eggs which is common and widely accepted. The non acceptance of quail eggs might be attributed to the fact that alot of people are yet unaware of the benefits of quail eggs over chicken eggs most especially in terms of the higher HDL cholesterol content which makes it even safer for adults who would ordinarily be avoiding the cholesterol in the chicken eggs. Basically in Nigeria, alot of homes rear chicken for consumption purpose, however, the rearing of quails has not become as prominent despite the many uses to which these birds may be put.

More attention should be given to this line of production as it is obvious the role they can play in food security in Nigeria. So many households that would have been food secure usually have a shortfall in the recommended 65g of protein per day and quail production will be one more way to solve this menace considering the fact that quail production does not require high level of expertise and could easily be raised just as most households raise local chickens. There are various articles on quail, however, more academic research should be carried out on quail as this will increase the knowledge base, forming a basis on which people can make quail products consumption decisions in Nigeria.

Quail production in Nigeria is an avenue to explore as one more step towards reducing the unemployment level in the country. This is because the study revealed that a sizeable number of people do not consume quail eggs due to reasons of being not readily available. Employment may be generated along the value chain of quail production some of which includes the quail birds breeding, quail meat production, quail egg production, quail eggs

wholesalers, cooked quail eggs retailing etc. So many jobs may be created along this value chain and holistically, this will be playing a major role in economic development in Nigeria while on the other hand boosting availability and invariably consumption hence moving the country further in the quest to attain national food security.

Consumers' preference for certain qualities were revealed to be big sized eggs with light yellow yolk colour, having thick white shell. With this finding, animal scientists and research institutes may work on improving on the current breeds of quails and come up with breeds that produces eggs that fit into the consumers' preferences.

Quail eggs are have high health values, however, as long as people are not aware of these benefits, they can hardly make consumption choices that includes quail eggs in their diet, neither can farmers make production choices that favours venturing into that line of production thereby diversifying and hence managing risk in poultry agricultural sector more effectively. It is of necessity that more awareness is created on the health benefits of quail eggs as this will be impactful on various aspects of the Nigerian economy including but not limited to health, job creation, food security, diversification & risk management.

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