CONSUMERS' WILLINGNESS TO PAY FOR QUAIL EGGS IN OGUN STATE, NIGERIA

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ABSTRACT
Rising demand for animal protein has necessitated the need to establish additional sources of protein. However, poultry products such as quail eggs or its meat, offer excellent nutritional benefits compared to chicken eggs. The study investigated consumers' willingness to pay (WTP) for quail eggs in Ogun State, Nigeria. Multi-stage sampling technique was used to obtain information from 200 consumers through a well-structure questionnaire. The analytical techniques used were descriptive statistics, double-bounded dichotomous choice model and ordered logit regression. Findings revealed that majority (67.7%) of the respondents were willing to pay more for quail eggs with a mean willingness to pay (MWTP) of ₦3,141.50 per crate of quail eggs. Factors such as awareness of quail eggs nutritional benefits (p < 0.05), sex (p < 0.10), marital status (p < 0.05), age (p < 0.01), years of education (p < 0.05), household size (p < 0.01) and income (p < 0.05) significantly influenced WTP. The study concluded that a significant proportion of the respondents were willing to pay an extra amount for quail eggs in order to maintain a healthy life. Therefore, the study recommends that raising public awareness about the nutritional benefits of quail eggs would encourage people to diversify their protein sources and consume more of quail eggs.

Key words: double-bounded dichotomous choice model, ordered logit model, quail eggs, willingness to pay

INTRODUCTION
The continuous growth in population in developing nations makes it necessary to create more market for animal proteins to meet the growing demand (El-Katcha *et al.,* 2015; Park and Yun, 2018). Nigeria, with a population estimate of above 200 million (NBS, 2019), faces a shortage in animal protein security, with an average consumption of 45.4 g per person daily which is less than both the FAO's minimum daily protein intake recommendation of 53.8 g and the world's average daily protein intake of 64 g. This situation suggests a deficiency of animal protein in Nigeria (Adamu *et al*., 2015; El-Katcha *et al.,* 2015; Akerele *et al.,* 2017; Protein Challenge, 2020). However, improving the poultry industry with a short generation interval is a promising alternative strategy for resolving the shortfall of animal protein in Nigeria.

In Nigeria, poultry birds consist of chicken, turkey, duck, quail and geese. Chicken eggs, recognized as nutritious food, are more economically accessible compared to other animal protein sources (Malik *et al*., 2018). Nevertheless, the landscape has witnessed recent developments with emerging players in the sector. The Japanese quail (*Coturnix coturnix japonica*) is gradually gaining recognition and prominence (Malik *et al*., 2018). Japanese quail can be prepared and consumed just like chicken, but it offers superior nutritional and medicinal benefits. According to Food Data Central (2019), the nutritional composition in 100 grams of quail eggs compared with chicken eggs contains choline (48% of the daily value (DV), 61% of the DV), riboflavin (61% of the DV, 32% of the DV), vitamin B_{12} (66% of the DV, 43% of the DV) and iron (20% of the DV, 9% of the DV) respectively.

Furthermore, quail eggs have been reported to have numerous medicinal benefits. Some of such benefits include increases in brain activity, stabilization of the nervous system, improvement of sexual health and eye sight, reduction of hypertension, removal of toxins and heavy metals from the body, lowering of the risk of having diabetes, prevention of cancer, helping in reversal of cellular damage, treatment of allergy symptoms, helping in treatment of respiratory disorders such as asthma and bronchitis (Tunsaringkarn *et al*., 2013; Aba *et al*., 2016; Baltaci *et al*., 2016; Sun *et al.*, 2019; Bao *et al*., 2020; Ravi, 2021).

In Nigeria, including in Ogun State, evidence has shown that quail eggs even though more nutritious, are not generally accepted and their consumption is lower than chicken eggs as the commercial chicken eggs are more preferred, eaten and readily available than quail eggs (Ogunwole *et al*., 2015; Odafe-Shalome and Owen, 2020). Also, the inadequate knowledge and information about the numerous nutritional benefits of quail eggs in Nigeria has made the production, sale and consumption of quail birds and its products difficult in the country. Although quails offer more nutritional benefits than chicken eggs, its production encounters certain challenges, including difficulties in stock procurement, the high expenses associated with feeding, issues related to pests and diseases, and limited market coupled with the need to raise its output and technical efficiency (Bakoji *et al*. 2013; Adeoti and Baruwa, 2019). Due to such reason, the production of quails requires a higher cost of production, and thus, consumers should pay a premium price for quail eggs.

Willingness to pay (WTP) according to Adekunle *et al.* (2016), is a measure that signifies the highest price a consumer is willing to spend on a product or service, which is influenced by the product's characteristics, institutional factors, and the socio-economic characteristics of the consumer. According to Quan *et al*. (2020), WTP estimates have historically been a useful tool for economists, indicating consumer demand and acting as a gauge of the importance people attach to enhancing a product's quality. In Nigeria, empirical studies on willingness of consumers to pay for quail eggs are scanty. The limited access to such studies is creating uncertainties for the farmers producing such products. Therefore, this study aims to fill the gap by examining the willingness of consumers to pay for quail eggs, assess the awareness of consumers about quail eggs medicinal benefits, identify consumer sources of nutritional information about quail eggs and also determine the factors influencing willingness to pay. The outcome of this study will provide useful insights for farmers, policy makers and other researchers who wish to conduct further research in this area.

MATERIALS AND METHODS

Study Area

This research was conducted in Ogun State, South West Nigeria. The landscape is predominantly covered by rainforests, with wooden savanna areas in the northwest. Ogun State is bounded by longitudes 3.258363 and latitudes 6.909833 with the GPS coordinates of 6° 59' 52.709" N and 3° 28' 25.456 E. The climate in the region is classified as tropical, wet, dry, and savanna, with an average annual temperature of 29.34°C (84.81°F), slightly lower than Nigeria's overall averages. In terms of land area, Ogun State ranks as the 24th largest state in Nigeria, covering ca. 16,762 km^2. The state, also called the gateway state, is known for high concentration of industrial estates, making it a significant manufacturing hub in the country (Ayojimi *et al*., 2020). By the latest national census, the state, with a total population of about 3,751,140 residents, ranked as the 16th most populated state in Nigeria (NPC, 2006).

The rural development of poultry system in Ogun State is essentially characterized by small to large-scale production, extensive or semi-intensive rearing (in cages or on deep litter) of improved breeds of domestic poultry, capital and labour-intensive with high input and high output. Ogun State is renowned for being the highest producer of poultry birds in the South-west geopolitical zone of Nigeria (Poultry Association of Nigeria, Ogun State Chapter—PANOG, 2015; Ayojimi *et al*., 2020). It is also known to be involved in quail farming (Adeoti and Baruwa, 2019). This area was however considered most appropriate due to its production of poultry eggs including quails.

Sampling Procedure

Multi-stage sampling technique was used for this study. The first stage involved randomly selecting two local government areas (LGAs) in Ogun State, which are Abeokuta South and Abeokuta North LGAs. The second stage involved randomly selecting 10 communities from each local government. The third stage involved the random selection of 10 households from each community to give a sample
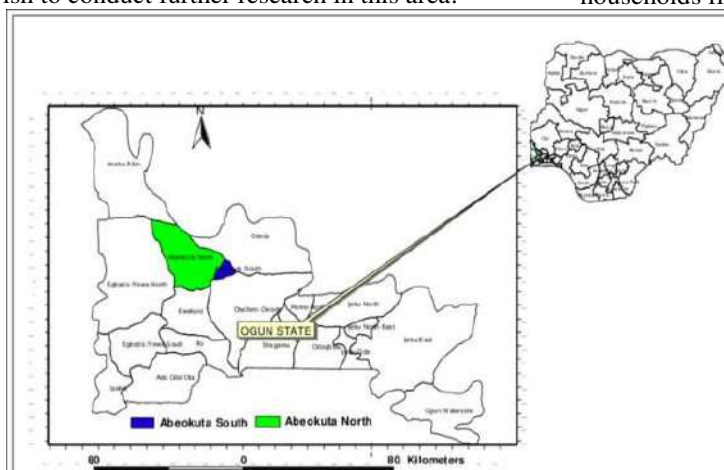

Figure 1: Map of Ogun State showing the study location

size of 200 respondents. In this study, individual members of the household who are in charge of major food purchases were required to provide answers to the questionnaire. However, respondents who were not able to write by themselves were guided with the aid of an interview guide.

Data Collection and Analysis
Primary data were collected for the course of this study. Data on socio-economic characteristics of the respondents as well as information on awareness of quail eggs benefits, sources of nutritional information about quail eggs and respondents' mean willingness to pay were obtained with the aid of a questionnaire/interview guide.

The analytical tools used for data analysis were descriptive statistics, contingency valuation method (double-bounded dichotomous choice model) and ordered logit regression. Descriptive statistics such as frequency table, mean, standard deviation were used to analyze socio-economic characteristics of the respondents. The willingness of respondents to pay for quail eggs was captured using the double-bounded dichotomous choice approach while ordered logit regression was employed to examine the factors determining consumers' WTP for quail eggs.

Contingency valuation method
This study used the double-bounded dichotomous choice (DBDC) approach, which was proposed by Hanemann *et al.* (1991). Brago *et al.* (2022) also employed the same DBDC model in their recent research on consumers' willingness to pay for quail products in Tamale Metropolis, Ghana. The DBDC method is known for having a greater efficiency and generating fewer biased estimates and provides narrower confidence intervals when compared to the single-bounded method (Brago *et al.,* 2022).

Using the DBDC method, respondents were asked if they were willing to pay a premium for quail eggs. In this study, willingness to pay was defined as the maximum price consumer is willing to pay for a crate of quail eggs. Their responses were either YES or NO. Those who responded yes to the initial question were offered a first bid. Specifically, they were asked if they would pay a premium of 50% for quail eggs, which is more than the average market price of one crate of chicken eggs. (The average market price of one crate of chicken eggs at the time of the survey was ₦2,400). Different premium levels were assigned to different respondents. Those who said yes to the first bid were offered higher bid premiums. Respondents who said no to the first bid were offered discounted bids (i.e., 10%, 20%, 30%, 40%, and 50%). The responses were classified into: YES-YES, YES-NO, NO-YES and NO-NO options. Furthermore, respondents who responded NO to the initial WTP question were regarded as zero WTP. Therefore, the total respondents were classified into five main

categories viz zero WTP, YES-YES, YES-NO, NO-YES and NO-NO categories. Respondents who belonged to the zero WTP categories were those unwilling to pay a premium for quail eggs, those whose responses were YES-YES imply respondents' willing to pay for both bids. A YES-NO means the respondents were willing to pay only the first bid but not the second bid. Also, a NO-YES response refers to respondents who were not willing to pay the first bid but were willing to pay the second lower bid, while a NO-NO response implies those respondents not willing to pay both the first and second bid. These categories of respondents were not willing to pay both the first and the second discounted bids but were willing to pay less than 10% of the second discounted bid.

Model Specification

Ordered logit regression model
The ordered logit regression model was employed to examine the factors influencing willingness to pay for quail eggs. The ordered logit was specified as:

$$y_i^* = \sum_i^n z_i\beta + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots (1);$$

The observed dependent variable which has ordinal values takes on the value 0 to m-categories and can be expressed as:

$$y_i = j \Leftrightarrow \lambda_{j-1} < y_i^* < \lambda_j \dots\dots\dots\dots\dots\dots\dots (2);$$

where y_i is the WTP for quail eggs, y_i^* is a latent and continuous variable that measures the categories of the consumers' willingness to pay, z_i is a set regressands, β is the parameter to be estimated, ε_i is the error term, and λ is the limit. Following Brago *et al.* (2022), the five ordered categories are expressed as:

$$y_0 = 0 \text{ if } y_i^* \leq 0 \text{ zero WTP}$$
$$y_1 = 1 \text{ if } < y_i^* \leq \lambda_1 \text{ NO-NO WTP}$$
$$y_2 = 2 \text{ if } \lambda_1 < y_i^* \leq \lambda_2 \text{ NO-YES WTP}$$
$$y_3 = 3 \text{ if } \lambda_2 < y_i^* \leq \lambda_3 \text{ YES-NO WTP}$$
$$y_4 = 4 \text{ if } y_i^* \leq \lambda_3 \text{ YES-YES WTP} \dots\dots\dots (3)$$

The ordered logit probabilities of m-categories can be stated under the assumption of gaussian errors (Maddala, 1983):

$$\pi (y_i \leq \tfrac{j}{z_i}) = \Lambda(\lambda_j - z_i'\beta) - \Lambda (\lambda_{j-1} - z_i'\beta) \dots (4)$$

The probabilities of the ordered categories are expressed as:

$$\begin{aligned}
\pi_0 (y_i = 0/z_i) &= \Lambda (- z_i'\beta) \\
\pi_1 (y_i = 1/z_i) &= \Lambda (\lambda_1 - z_i'\beta) - \Lambda (- z_i'\beta) \\
\pi_2 (y_i = 2/z_i) &= \Lambda (\lambda_2 - z_i'\beta) - \Lambda (\lambda_1 - z_i'\beta) \\
\pi_3 (y_i = 3/z_i) &= \Lambda (\lambda_3 - z_i'\beta) - \Lambda (\lambda_2 - z_i'\beta) \\
\pi_4 (y_i = 4/z_i) &= 1 - \Lambda (\lambda_3 - z_i'\beta) \dots\dots\dots\dots (5)
\end{aligned}$$

Using the maximum likelihood estimates (MLE) criteria and a log-likelihood function, the parameters of the five probability outcomes can be reliably and effectively evaluated:

$$Lnl = \sum (i = 1)^{\wedge}n\{d^{yy} \ln^{yy} (\lambda i, \lambda_{SH}) + d^{yn} \ln^{yn} (\lambda i, \lambda^{SH}) + d^{ny} \ln^{ny} (\lambda i, \lambda_{SL}) + d^{nn} \ln^{nn} (\lambda i, \lambda_{SL}) + d^{z} \ln^{z} (\lambda i)\} \dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (6)}$$

where d^{yy}, d^{yn}, d^{ny}, d^{nn} are dummy variables, 1 if an assertion is correct and 0 otherwise. The set of independent variables are Z_1 is gender (female = 1, male = 0); Z_2 is marital status (single = 0, married = 1); Z_3 is age (years); Z_4 is education (no formal education = 0, primary = 1, secondary = 2, tertiary = 3); Z_5 is household size (number of persons per household); Z_6 is high monthly income (1 for a household earning above ₦150,000; otherwise, 0); Z_7 is medium monthly income (1 for household earning between ₦50,000 and ₦150,000, otherwise, 0); Z_8 is low monthly income (1 for a household earning below ₦50,000; otherwise, 0); Z_9 is awareness of the respondents on the nutritional benefits of quail eggs (aware = 1, otherwise, 0); Z_{10} is awareness of the respondents on the availability of quail eggs (aware = 1, otherwise 0).

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

The results of the socio-economic characteristics as shown in Table 1 showed that the majority of the consumers were females (84%), and married (62%), while about 54% of the respondents had a mean household size of five persons. This implies that women are the purchasers of most food items in the households. The mean age of the respondents was 37 years. Thus, most of the consumers were young. The findings corroborate with the study of Ogunwole *et al.* (2015) who said that most of the egg consumers were youths and economically active people who could make decisions. Also, the majority (89.5%) of the consumers had a formal level of education. Among those with formal education, 16.5% had primary education, while 45 and 28% completed their secondary and tertiary education, respectively. This implies a high level of education among the respondents could influence their decision to consume healthier foods due to awareness of their nutritional benefits. This corroborates the result of

Brago *et al.* (2022) who noted that high educational level enhances safer food consumption which could lead to enhanced knowledge of the willingness to pay scenario. Furthermore, the result also shows that majority (73%) of the respondents belonged to the middle and high-income classes.

Awareness of Quail Eggs Health Benefits

Result of the consumers' awareness of the medicinal benefits of quail eggs are presented in Table 2. Higher proportions of the consumers were aware that quail eggs help in treating respiratory disorders such as asthma and bronchitis (71.5%), lowers the risk of having diabetes and kidney disorders (80%), helps in detoxifying the body as they contain antioxidants like beta-carotene and vitamins A, C, and E (72%), reduces cholesterol and the risk of developing heart disease (50.5%) and also prevents the growth of cancer in the body (66.5%).

Table 1: Distribution of respondents by their socio-economic characteristics

Variables	Frequency	Percentage	Mean
Gender			
Female	168.00	84.00	
Male	32.00	16.00	
Marital status			
Single	76.00	38.00	
Married	124.00	62.00	
Age			
< 20	16.00	8.00	36.72
21-30	60.00	30.00	
31-40	52.00	26.00	
41-50	48.00	24.00	
51-60	16.00	8.00	
> 60	8.00	4.00	
Education			
No formal	21.00	10.50	
Primary	33.00	16.50	
Secondary	90.00	45.00	
Tertiary	56.00	28.00	
Household size			
1-3	108.00	54.00	
4-6	40.00	20.00	
7-9	52.00	26.00	5.46
Income			
Low	70.00	35.00	
Middle	76.00	38.00	
High	54.00	27.00	

Field Survey (2022)

Table 2: Consumers' awareness of quail eggs' health benefits

Nutritional benefits	Awareness (%)
Quail eggs help in treating respiratory disorders, e.g., asthma and bronchitis	71.50
Quail eggs lowers the risk of having diabetes and kidney disorders	80.00
Quail eggs help in detoxifying the bodies as they contain antioxidants like beta-carotene and vitamins A, C, and E	72.00
Quail eggs help to reduce cholesterol and the risk of heart diseases	50.50
Quail eggs help prevent cancer	66.50
Quail eggs alleviate symptoms of hypertension	61.00
Quail eggs help to repair damaged tissues	78.50
Quail eggs are used to treat sexual impotence	48.00
Quail eggs contain more minerals and vitamins than chicken eggs	80.00
The alkaline nature of quail eggs neutralizes acidity in the digestive tract	71.00
Quail eggs get rid of unwanted pills	56.50
It can be used in the treatment of age-related diseases	66.00
Potassium in quail eggs inhibits the urinary excretion of calcium	49.50
It naturally cures gastritis, stomach ulcers, and duodenal ulcers	67.00

Field Survey (2022)

Most (61%) of the respondents were aware that quail eggs could alleviate symptoms of hypertension in men, repairs damaged tissues (78%), treats sexual impotence (48%) and also contains more minerals and vitamins than chicken eggs (80%). The majority (71%) of the consumers knew of the alkaline nature of quail eggs which neutralizes acidity in the digestive tract. Also, about 56.5% were aware that quail eggs help to get rid of unwanted pills from the body, while 66% were aware that quail eggs can be used to treat age-related diseases. The data in Table 2 also show that about 67% of the respondents were aware that quail eggs naturally cure gastritis, stomach ulcers, and duodenal ulcers, while only 49.5% agreed that potassium in quail eggs inhibits the urinary excretion of calcium. These findings implied that the consumers were generally aware of quail eggs benefits. The result of this study aligns with that of Aromolaran *et al.* (2016) and Brago *et al.* (2022), who stated in their studies that majority of the consumers were aware of the medicinal benefits inherent in quail products but contradicts the result of Iwuchukwu *et al.* (2015), who found out that respondents had inadequate knowledge of the medicinal benefits of quail.

Sources of Respondents' Information on the Nutritional Benefits of Quail Eggs

Figure 2 presents the sources of respondents' information on quail eggs benefits. The result indicated that about half of the consumers acquired nutritional information about quail eggs from the internet (50.7%), family and friends (49.2%) while few acquired information from radio (27%), television (22%), newsprint (9%), and workshops (5%). These results suggest that internet sources such as Facebook/twitter served as the major means of disseminating nutritional information about quail eggs. This outcome aligns with the findings of past studies by Brago *et al.* (2022), who found that Facebook and Twitter, among other social media, served as the major source of information for consumers about quail products (meat and egg) but contrast the findings of Nyameh *et al.* (2014) who stated that consumers sources of information about quail eggs were gotten from family and friends.

Consumers' Willingness to Pay for Quail Eggs

The data in Table 3 show that most (67.7%) of the consumers were willing to spend extra amount for quail eggs, while only 32.3% were not ready to pay beyond the normal price of one crate of chicken eggs. Out of those who were willing to pay a premium, 31% were willing to pay a premium for both the first and the second bid, 14% were willing to pay for the first bid but not willing to pay for the second higher bid, 12% were willing to pay only the second lower bid while only 10.7% were unwilling to pay any of the proposed bids. This implies that most of the respondents' willingness to pay an extra amount for quail eggs could be attributed to their education, income and other socio-economic characteristics which could influence them to be willing to pay more. This finding corroborates the results of Brago *et al.* (2022) who found out that a higher percentage of the consumers were ready to spend extra amount on quail eggs.

Mean Willingness to Pay (MWTP) for Quail Eggs

Table 4 shows that most (67.7%) of the respondents were willing to pay a mean price of ₦3,141.50 for one crate of quail eggs, the minimum and maximum amount being ₦800 and ₦6000, respectively. This implies that most of the consumers were ready to spend more of their income on quail eggs. This corroborates the result of Brago *et al.* (2022), who observed that consumers were willing to spend an extra income on quail eggs.
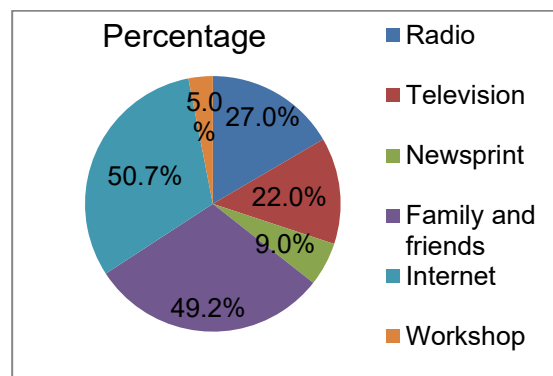

Figure 2: Distribution of respondents by information sources. Field Survey (2022)

Table 3: Summary statistics of the respondents by their WTP

Variables	Measure	Frequency	Percentage
Zero WTP	Not willing to pay a price premium for quail eggs	64.60	32.30
NO-NO	Not willing to pay any of the proposed bids	21.40	10.70
NO-YES	Not willing to pay the first bid but willing to pay the second lower bid	24.00	12.00
YES-NO	Willing to pay the first bid but unwilling to pay the second higher bid	28.00	14.00
YES-YES	Willing to pay both bids	62.00	31.00

Field Survey (2022)

Table 4: Estimates of mean willingness to pay (MWTP) for quail eggs

	Willingness to pay (WTP) for quail eggs				
Statistics	MWTP (₦)	WTP (%)	Minimum (₦) WTP	Maximum (₦) WTP	Standard deviation
MWTP	₦3,141.50	67.70	800.00	6,000.00	1267.57

Field Survey (2022)

Factors Determining Consumers' Willingness to Pay

Tables 5 and 6 show the parameter estimates and marginal effects from the ordered logit regression of the factors determining willingness to pay for quail eggs. From Table 5, the coefficient of age (–0.0356) was negative and significantly ($p < 0.01$) influenced the likelihood of paying an extra amount for quail eggs. Also, marital status (0.4255), household size (0.2218) education (0.5698), income (0.4960), awareness of quail eggs nutritional benefits (0.7838) and gender (0.5027) had a positive and significant effect on the likelihood of consumers paying an extra amount for quail eggs ($p < 0.05$ and $p < 0.10$) in the study area. However, because the coefficient estimates do not give sufficient information about the magnitudes, the result of the marginal effect from the ordered logit regression was used in explaining the factors influencing the consumers' WTP.

From Table 6, analysis reveals that being female increases the likelihood of choosing a YES-YES option by 10.2%. This may be due to the fact that women who are the primary caretakers of their families are more concerned about the nutritional status of their household members and are thus willing to sacrifice an extra amount for quail eggs in order to provide healthy and nutritious foods for their families. Marital status has a positive and significant effect on the likelihood of choosing a zero WTP, YES-NO and YES-YES options by 6.6, 4.1 and 4.5%, respectively. This implies that a highest percentage (6.6%) of the married people were more likely to be unwilling to pay more for quail eggs. This may be because married people have financial responsibilities towards their families which may make them unable to afford quail eggs due to its cost and thus may prefer alternative protein sources. This contradicts the results of Brago et al. (2022), who indicated that being married reduces the likelihood of choosing the NO-YES option but increases the likelihood of selecting a YES-NO and YES-YES option by 0.4, 0.78, and 7.2%, respectively. This is because married people are more concerned about the well-being of their household members; they are more likely to pay more for safe and nutritious foods.

The marginal effect data show that age reduces the likelihood of selecting a NO-NO response by 0.08% but increases the chances of choosing a YES-NO and YES-YES option by 0.15 and 0.72%, respectively. This is because quail eggs aid in the treatment of age-related diseases like hypertension, diabetes and other cardiovascular diseases and as such, older people suffering from these health-related conditions are less likely to be uninterested in paying some extra amount for quail eggs but rather they would be willing to pay a price premium for quail eggs in order to get the medicinal benefits embedded in them. This result is in resonance with the existing studies that observed that the respondents' age increases their willingness to pay (Lagerkvist and Hess, 2011) but disagrees with Balogun et al. (2020), who stated that the older the age of a consumer, the lesser his willingness to pay.

Education reduces the likelihood of choosing a NO-NO option by 1.2%. This may be because education enhances people's knowledge about the benefits of a product. Hence, people who are educated about the nutritional benefits of quail eggs are less likely to be unwilling to pay an extra amount for quail eggs. Also, the marginal effect further shows that having a formal education increases the likelihood of selecting a YES-NO and YES-YES option by 0.5 and 5.4%. This suggests that the higher the level of education, the more the consumers would be willing to sacrifice extra amount for quail eggs. This result is similar with the results of other empirical studies which reported that education increases WTP (Emadi and Rosta, 2016; Omar et al., 2016; Amfo et al., 2018).

Table 5: Estimates of ordered logit regression

Variables	Coefficients	Std. error	Z
Gender	0.5027*	0.2890	–1.74
Marital status	0.4255**	0.1243	–3.42
Age	–0.0356***	0.0130	–2.73
Education	0.5698**	0.2208	–2.58
Household size	0.2218***	0.0579	–3.83
Low income	–0.2844	0.2295	–1.24
Middle income	–0.0756	0.2041	–0.37
High income	0.4960**	0.2319	2.14
Awareness of quail eggs benefits	0.7838**	0.3498	2.24
Availability of quail eggs	–0.0758	0.1883	–0.40

Field Survey (2022). ***, **, * - significant at 1, 5, and 10%, respectively; Z - independent variables

Table 6: The Marginal effects of the ordered logit model

Variables	Willingness to pay (WTP) for quail eggs									
	Zero WTP		NO-NO WTP		NO-YES WTP		YES-NO WTP		YES-YES WTP	
	Coef. ($y = 0$)	SE	Coef. ($y = 1$)	SE	Coef. ($y = 2$)	SE	Coef. ($y = 3$)	SE	Coef. ($y = 4$)	SE
Gender	–0.1115	0.0637	0.0118	0.0079	0.0002	0.0041	0.0208	0.0132	0.1022*	0.0584
Marital status	0.0656**	0.0277	0.0006	0.0029	0.0001	0.0002	0.0411***	0.0053	0.0452*	0.0253
Age	–0.0079	0.0029	–0.0008*	0.0005	0.0004	0.0003	0.0015**	0.0007	0.0072**	0.0026
Education	0.0155	0.0492	–0.0116**	0.0053	0.0002	0.0006	0.0052***	0.0014	0.0541**	0.0245
Household size	0.0004	0.0129	0.0035**	0.0014	0.0042**	0.0019	0.0109***	0.0027	0.0244**	0.0118
Low income	0.0634	0.0510	0.0067	0.0061	0.0020	0.0023	0.0121	0.0103	0.0579	0.0468
Middle income	0.0168	0.0455	0.0018	0.0049	0.0005	0.0016	0.0032	0.0087	0.0154	0.0415
High income	–0.1105**	0.0517	–0.0116*	0.0071	0.0035	0.0041	0.0210*	0.0117	0.1009**	0.0472
Awareness of benefits	–0.1864**	0.0826	–0.0117*	0.0066	0.0078	0.0090	0.0383*	0.0208	0.1471**	0.0600
Availability of quail eggs	0.0168	0.0419	0.0018	0.0045	0.0005	0.0006	0.0032	0.0080	0.0154	0.0383

Field Survey (2022). ***, **, * - significant at 1, 5, and 10%, respectively; Coef. - coefficient; SE - standard error

Concerning household size, an increase in number of family members increases the consumers' likelihood of paying extra amount for quail eggs by 0.35, 0.42, 1.09, and 2.04%, with respondents choosing the NO-NO, NO-YES, YES-NO and YES-YES options respectively. This implies that the more the household members, the higher the likelihood of paying an extra amount for quail eggs. Households who are food safety conscious and particular about the health of their household members may be willing to spend extra amount for quail eggs to improve the nutritional status of their households. The findings of this study corroborate that of Amfo *et al.* (2018) and Brago *et al.* (2022), who stated that increase in household size increases the expenditure on food.

Furthermore, high income reduces the likelihood of choosing a zero WTP and NO-NO options by 11.1 and 1.2% respectively. This is because people with high income can afford the price of quail eggs and as such are more likely to select a YES-NO and YES-YES option. Since quail eggs have numerous medicinal benefits, high income earners are motivated to spend a larger share of their income on quail eggs compared to middle or low-income earners. The outcome of this study is in tandem with the findings of earlier research which suggested that respondents' income had a direct effect on their willingness to pay (Adekunle *et al.*, 2016; Nandi *et al.*, 2017).

Awareness of the nutritional benefits of quail eggs significantly influenced respondents' willingness to pay more. The marginal effects showed that awareness of quail eggs nutritional benefits reduces the likelihood of selecting a zero WTP and NO-NO option by 18.6 and 1.2%. This implies that being aware of the medicinal benefits of quail eggs reduces the likelihood of consumers paying less for quail eggs but increases the chance of choosing a YES-NO and YES-YES options by 3.8 and 14.7%, respectively. This suggests that being knowledgeable about the nutritional benefits of a product will motivate consumers to be willing to pay more for it. Therefore, awareness of quail eggs nutritional benefits will increase the likelihood of consumers paying a price premium.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that consumers were willing to pay an extra amount for quail eggs to have a healthy lifestyle. On this basis, it is therefore recommended that poultry farmers should be encouraged to venture into quail farming as there is a certainty of having a market for quail eggs. Also, the government should encourage farmers to go into quail production by providing subsidized feed and other inputs in order to reduce the cost of production. Furthermore, awareness of quail eggs

nutritional benefits should be enhanced through various media such as television, radio, workshops, and newspapers to increase people's knowledge about quail eggs benefits, encourage them to diversify their protein sources and increase their consumption of quail eggs.

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