Original Research Article

Consumers' willingness to pay for safe buka foods[1]: A case study of workers in Nigeria tertiary institutions

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Abstract

The rising demand for food quality as well as the crisis of food safety in recent years is increasing consumers' consciousness of the safety of food they consume. This study analysed the willingness of workers in tertiary institutions to pay for safe buka foods using the Federal University of Agriculture, Abeokuta as a case study. The Contingency Valuation Method (CVM) was used to assess the Willingness-To-Pay (WTP) of a total of 250 members of staff in the University including teaching and non-teaching sampled for the study. The respondents' were selected using a multistage simple random sampling technique. Data were collected with the aid of a structured questionnaire and analysed using descriptive statistics, and logit regression model. The study found that majority of the respondents' are still within the economically active age group with a mean age of 40 years. The respondents have spent an average length of 7 years working in the University. The commuting time between the respondents' home and the University is more than 30 min. Almost half of the respondents (46.8%) perceived foods from buka to be very unsafe for consumption. More than half (69.2%) of the respondents confirmed to have had food related ailments among which 57.8% were able to trace the ailment back to the buka foods they ate. An appreciable number of the respondents (83.2%) were willing to pay for the safety of buka foods with a mean WTP of ₦32.5 ($0.16) per plate on any of the buka foods reflecting the prevailing situations in Nigeria and valid exchange rates at the time the data were collected in 2015. The logit regression analysis revealed that bid amount, income, household size and commuting time were the significant factors influencing the probability of respondents' WTP for buka foods safety. The study concludes that WTP for safe buka foods among the respondents is positive and recommends that the government through her regulatory agencies should help to enforce the necessary standards procedures that buka foods operators will follow to ensure the safety procedures. Buka foods operators on the other hands should abide to the set standards as consumers are willing to pay more to ensure that they consume safe food. The respondents should also be encouraged to maintain small household size so that they will be able to pay more for the safety offoods they consume as smaller household size tends to reduce their financial responsibility.

Keywords: premium safety; contingency valuation; public health; hygienic foods; double bounded.

INTRODUCTION

The rising demand for food quality is increasing consumers concern on the safety of food they consume (Lappo et al., 2015), as food safety is an important component of food quality (Yu and Abler, 2009). Crises associated with food safety in more recent time such as the baby milk powder incident (Gossner et al., 2009), Bovine Spongiform Encephalopathy (Mad Cow disease), Avian Influenza (Bird Flu) problems (Wong and Yuen, 2006) coupled with the rising consumer concerns has made food safety an increasingly important public health issue which governments all over the world are intensifying efforts to improve (Liu et al., 2009). According to World Health Organization (WHO; 2002), food safety is a basic human right, an assurance that food, when consumed in the usual manner, does not

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1   Buka foods are foods eaten outside home at the canteen

cause harm to human health and wellbeing. Satin (2008) defined food safety as standard procedures involved in the handling, preparation, and storage of food to prevent contamination and food borne diseases. WHO (2002) asserted that safe food ensures good health, enhance productivity and provides an effective platform for development and poverty alleviation. A buka is simply an eating place where ready to eat food are bought and eaten or taken away. It can also be defined as a typical 'chop house' where meals like pounded yam, *amala, fufu*, rice, beans, semovita, eba and all sorts of meat, fish and soup are sold. Hygiene is a major concern in consuming buka foods. Food hygiene according to Iragunima (2006) refers to the basic rules of handling required of food operators which have influence on the health and wellbeing of an individual. WHO (2010) highlights five key principles of food hygiene including:

1. Prevent contaminating food with pathogens spreading from people, pets, and pests.
2. Separate raw and cooked foods to prevent contaminating the cooked foods.
3. Cook foods for the appropriate length of time and at the appropriate temperature to kill pathogens.
4. Store food at the proper temperature.
5. Use safe water and cooked materials.

Oghenekohwo (2015) noted that while intricate standards are being set for food preparation in developed countries; the main issue in less developed countries is simply the availability of adequate safe water. Buka foods consumption has been a prominent culture in many tertiary institutions in Nigeria for a long time due to factors such as long hours of commuting which leave little time to cook at home. This relatively long number of years has however not translated into significant standardization of the buka foods enterprise in terms of food safety as several cases of food poisoning and other food borne diseases are still being reported among the consumers of buka foods. This study is thus born out of deep concern for the dangers inherent in consuming unhygienic food. To the best of our knowledge, there have been no efforts in Nigeria to estimate the willingness of staff in tertiary institutions to pay for safe buka foods despite the rampant consumption of foods from buka among them. Our null hypothesis (H_0) is that consumers are not willing to pay for safe buka foods in the study area, while the alternative hypothesis (H_1) is that consumers are willing to pay for safe buka foods. The aim of this study therefore, is to provide empirical evidence on the awareness and willingness of staff in tertiary institutions using the Federal University of Agriculture, Abeokuta (FUNAAB) as a case study to pay for quality buka foods. More specifically, the study seeks to investigate the respondents' awareness of food safety issues, determine the willingness of the respondents to pay a premium for safe buka foods and analyse how the socio-economic characteristics of the respondents influence their WTP for safe buka foods. Findings from this study will not only add to literature on food safety, food consumption but it will be of great value by creating awareness for further studies on food safety.

MATERIAL AND METHODS

Study Area

This study was conducted at the Federal University of Agriculture, Abeokuta, Ogun State (FUNAAB) established on January 1, 1988. The University is located in the North-Eastern end of the city, 15km from Abeokuta city centre with over 1,983 staff including teaching and non-teaching who lives outside the University campus. The University was purposively selected of all the tertiary institutions in Nigeria because it is a University of Agriculture and people there are supposed to know better not only in terms of food production, processing but also about food safety.

Valuation of food safety: the CVM approach

The benefit of food safety is a non-market value. Hence it can be estimated using non-market valuation technique. In this study, we adopted the most popular and most appropriate non-market valuation technique for measuring food safety (Buzby et al., 1995; Liu et al., 2009) of the Contingent Valuation Method (CVM) to estimate consumers' willingness to pay for safe buka foods. Quite a number of studies have used CVM to elicit consumers' willingness to pay (WTP) for food safety such as Golan and Kuckler (1999), Antle (2001), Radam (2007), Liu et al. (2009) and Sckokai et al. (2014). The CVM has different elicitation techniques with wide variation in the WTP estimates (Liu et al., 2009). The open-ended payment card, dichotomous choice approach, and choice experiment are the elicitation approaches prevalent in the current literature (Ready et al. 1996; Liu et al., 2009;Okojie and Akinwunmi 2010; Yang et al., 2013; Arowolo et al., 2014).

The dichotomous choice approach also known as the discrete choice is the most widely used approach in eliciting information about the respondent's WTP (Liu et al., 2009). The two basic WTP elicitation formats of the dichotomous approach are the single bounded and double bounded (Liu et al., 2009). While the double bounded approach tends to be more efficient than the single bounded estimator by yielding a higher WTP; the single bounded method has some advantages over the double bounded in terms of less information requirement, easier implementation at both data collection and estimation stage and also avoids the systematic response bias which occurs as a result of the introduction of follow-up questions (Calia and Strazzera, 2000).

We adopted the single bounded dichotomous choice technique to estimate the respondents WTP for the safety of buka foods. In the single-bounded survey as the name implies, one bid value is presented to the respondents to which they respond 'yes' if they are willing to pay the proposed amount and no if they are not willing to pay the stated amount. The single bounded estimation procedure proposed by Hanemann (1984) and used by Tapsuwan (2005) and Akhter and Yew (2015) was adopted for this study.

Modelling food safety

The respondents were assumed to derive a certain level of utility from WTP for the safety of buka foods. The individual's utility function according to Hanemann (1984) is specified as:

$$u = v (Q_j, Y, X) (j = 0, 1) \quad (1)$$

Where Q is the safety of buka foods and $j = 0$ if Q is reduced and $j = 1$ if Q is maintained or increased, Y represents the income and X indexes the respondents' socio-economic characteristics and other observable attributes which might influence individuals preferences.

If the safety of buka foods is increased or maintained, the individual utility function becomes:

$$u_1 = (Q_1, Y, S) \text{ and } u_0 = (Q_0, Y, S) \text{ if the quality is decreased.}$$

However the researcher cannot observe all the components of the individual's utility function. Hence the utility function will be:

$$u (Q_j, Y, X) = v (Q_j, Y, X) + \varepsilon_j (j = 0, 1) \quad (2)$$

Where ε_j is the stochastic error term accounting for the unobservable components and both ε_0 and ε_1 are independent with zero means.

When the respondent is given a proposed amount A to pay for an improvement in the safety of buka foods, the individual will answer a 'yes' if only $v(Q_1, Y - A, X) + \varepsilon_1 \geq v(Q_0, Y, X) + \varepsilon_0$ and 'no' otherwise.

The probability of 'yes' response P_i is presented as:

$$P_i = Pr \{\text{response is 'Yes'}\} =$$
$$= Pr \{v (Q_1, Y - A, X) + \varepsilon_1 \geq v (Q_0, Y, X) + \varepsilon_0\} \quad (3)$$

The probability of 'no' response P_0 is:

$$P_0 = Pr \{\text{response is 'No'}\} = 1 - P_i \quad (4)$$

Defining the difference between the random variable $\varepsilon_1 - \varepsilon_0$ as η

If we determined the utility difference by $\Delta v = v(Q_1, Y - A, X) - v(Q_0, Y, X)$, Pi can be written as:

$$P_i = F_\eta (\Delta v) \quad (5)$$

Assuming that ε follows a logistic regression, then we can write the equation as:

$$P_i = F_\eta (\Delta v) = 1/ (1+) \quad (6)$$

An individual would agree to pay if their WTP is greater than the offered amount.

The probability of 'yes' for a given amount 'A' is represented by

$$P_i = Pr (WTP > A) = 1/ (1+) \quad (7)$$

Then, the probability of WTP is less than or equal to A is given by A

$$Pr (WTP) \leq A) \equiv G (A) = 1 - [1/ (1+)] \quad (8)$$

Where, G (●) is the cumulative distribution function of the WTP.

The logit model used in this study takes the form:

$$P_i = E (Y_i = 1/X_i) = 1/ [1 + \exp - (\beta_0 + \beta_1 BID_i + \beta_k X_{ik} + \varepsilon_i)] \quad (9)$$

where P_i is the probability that $Y_i = 1$ (response is 'Yes'), BID_i is the bid amount, X_i is the vector of independent variables (Bid, Sex, Age, Work experience, Household size, Primary income, Secondary income, Commuting time) that influence the probability, i indexes the individual observations, β_0 is the intercept, β_1, and β_k are parameters of bid, and independent variables, respectively, and ε_i error term follows a normal distribution with a mean zero and variance σ^2.

The logit model was estimated using the maximum likelihood Estimation (MLE) technique, the most commonly used technique for estimating the logit model (Lee 1997).

The description of variables of the logit model is shown in Table 1 below:

Table 1. Description of variables in the logit model

Variables	Description	Expected sign
WTP	Willingness to pay for safety of buka foods (1 if yes, 0 otherwise)	+
Bid	Amount offered to pay for safe buka foods (₦)	-
Sex	Gender if respondents (1 = Male, 0 = Female)	undecided
Age	Age of the respondents (Years)	undecided
Work experience	Length of time spent in the University (Years)	+
Household size	Number of persons in the household (Number)	-
Primary income	Income from main University job (₦)	+
Secondary income	Income from other jobs outside the University (₦)	+
Commuting time	Travel time from home to office (Minutes)	+

Survey design

The target respondents' of the survey were members of staff of the Federal University of Agriculture, Abeokuta. In order to have a good representation of the categories of staff (teaching and non-teaching) in the University as part of the survey, the staffs were first segregated into teaching and non-teaching. Then, a proportionate random sampling technique was used to select a total of 250 respondents sampled for the survey consisting of 108 teaching and 142 non-teaching staff. Following the conclusion of Calia and Strazzera (2000) in their study 'Bias and Efficiency of Single vs. Double Bounded Models for Contingent Valuation Studies: A Monte Carlo Analysis' that a medium sample size of 250–400 performed well in giving a point estimates of parameters and mean WTP, the minimum sample size of 250 was chosen given budget and time constraints. It should be noted that while not all staff of the University consume buka foods, non-consumers of buka foods were also included in the survey. This is because while they might not have a present buka use value, there is a possibility of a future use value. Hence, both consumers and non-consumers of buka foods were included in the survey. This was possible due to capability of the CVM to capture both use and non-use values.

A pre-test survey was conducted to determine the bid amounts to be offered in the dichotomous-choice contingent valuation survey. The pre-test was an open-ended contingent valuation survey in which the respondents were asked how much they will be willing to pay for the consumption of safe buka foods. The data generated were used to develop the bid vectors $(b_1 .... b_m)$ from which the bid amounts $(b_1, b_2, ... ,b_m)$ used in eliciting willingness to pay in the dichotomous choice contingent valuation survey were selected following Bergland et al. (1987) approach as used by Okojie and Akinwunmi (2010) and Arowolo et al. (2014). This involves an equal linear increment of the lower and upper bid amounts in the pre-test open-ended contingent survey data. A total of ten (10) bid amounts were used in the actual dichotomous-choice contingent valuation method survey. This agrees with the 10–15 bid amounts that have always been used in CVM studies according to Cooper (1993) and as used by Okojie and Akinwunmi (2010) and Arowolo et al. (2014). The bids used in the survey include ₦20 ($0.10), ₦25($0.13), ₦30($0.15), ₦35(0.18), ₦40($0.20), ₦45($0.23), ₦50 ($0.25), ₦55($0.28), ₦60($0.30), and ₦65($0.33).

The format of the single-bounded dichotomous choice was as follows:

The respondents were asked 'If the price per plate of any of the buka foods is increased by a certain amount to ensure the consumption of safer buka foods, would you be willing to pay for it?'   Yes [ ] No [ ]

Each respondent was offered only one bid amount, selected randomly from the above stated range (₦20 ($0.10) to ₦65 ($0.33) of bids. Questions in the survey instrument (questionnaire) include the respondents' socio-economic characteristics such as age, sex, working experience, household size, income from major and minor occupation. Other questions include commuting time, food safety issues as well as their willingness to pay for safe buka foods.

RESULTS

The descriptive statistics of the variables in the logit model is summarised in Table 2. The table shows that the age of the respondents on the average was 40 years, an indication that they are still in their economically active years. The average length of years spent working in the University by the respondents was also found to be 7 years. An average respondent had about 6 persons in the household. The respondents also spent well above 30 min travelling from their respective homes to the office on a daily basis. The respondents' earned an average income of ₦109,792.15 ($551.44) and ₦7,245.00 ($36.39) from their main occupation in the University and from a job outside the University, respectively.

Responses to questions relating to food safety issues are presented in Table 3. Most (91.5%) of the respondents tended to be conscious of the safety of the food they eat. Almost half (46.8) of the respondents perceived buka foods to be very unsafe, about one quarter (28.4%) perceived it to be 'fairly safe', and 18.8% thought they are 'safe' while only 6% perceived food from buka foods to be 'very safe'. More than half (69.2%) of the respondents confirmed to have had food-related ailments before, ranging from cholera (17.9%), stomach upset (41.6%), diarrhoea (26.6%) to dysentery (13.9%) among which 57.8% were able to trace the ailment back to the buka foods they ate. Interestingly, an appreciable number of the respondents (83.2%) were willing to offer more money for safer buka foods. This implies that the respondents are concerned of the safety of buka foods they consume, hence are willing to pay for improvements in the safety of foods they consume. This is similar to the findings of Akinbode (2005), Liu et al. (2009) and Sckokai et al. (2014) who stated that consumers are willing to pay a premium safety of street food, an additive-free moon cake and reduced-mycotoxins milk respectively.

The result of the logit regression analysis used to analyse the influence of the respondents socio-economic factors on their probability of acceptance of the bid (WTP) offered for the safety of buka foods is shown in Table 4. The result showed that bid and household size have a negative significant relationship with the probability of being willing to pay for the safety of buka foods. The negative and significant effect of the bid ($P < 0.01$) with WTP implies

Table 2. Descriptive statistics of variables in the logit model

Variables	Mean
Age (years)	39.85
Sex	0.69
Work experience (years)	6.76
Household size (number of people)	5.88
Income from primary occupation (₦)	109,792.15 ($551.44)
Income from secondary occupation (₦)	7,245.00 ($36.39)
Travel time from home to office (Minutes)	45.91

Source: Field Survey, 2015

Table 3. Responses to food safety issues

Food safety issues	Response	Frequency	Percentage (%)
Conscious of the safety of food consumed	[a]Affirmative	227	91.5
	Unsafe	117	46.8
Perception of the safety of buka foods	Fairly safe	71	28.4
	Safe	47	18.8
	Very safe	15	6.0
Had any food related ailments	Affirmative	173	69.2
	Cholera	31	17.9
Name of ailments	Stomach upset	72	41.6
	Diarrhoea	46	26.6
	Dysentery	24	13.9
Link ailment to buka foods consumed	Affirmative	100	57.8
	[b]Non-affirmative	73	42.2
Willingness to pay for safe buka foods	Affirmative	208	83.2
	Non-affirmative	42	16.8
Mean WTP	₦32.5 ($0.16)		

Note: a - Affirmative response is a yes option, b - Non-affirmative represent the no option 1$ = ₦198.8 as at September 2015 when the data was collected
Source: Field Survey, 2015

that the probability of the respondents accepting a bid offered for safety of buka foods decreases with increase in the bid amount that is being offered. Liu et al. (2009) also obtained a similar result of a negative relationship between willingness to pay for food safety and bid amount offered. Household size had a negative significant relationship ($P < 0.1$) with the probability of a yes response for paying a premium for safe buka foods. This implies that respondents with a higher number of members in the household have a lower probability of being WTP for the safety of buka foods. This could be due to the fact that they have more of

Table 4. Maximum likelihood estimates of the logit model

Variable	Coefficient	Standard error	t-ratio
Constant	5.101	1.0250	1.2603
Bid	-0.08775***	0.0254	3.45
Sex	-0.1244	1.672	0.074
Age	-0.05062	0.2996	-0.169
Working experience	0.02088	0.03679	0.568
Household size	-0.1902*	0.1078	-1.764
Primary income	0.003508***	0.001058	3.316
Secondary income	0.005252	0.005162	1.0174
Commuting time	0.08922***	0.02476	3.603

Log likelihood function = -91.001; Log likelihood (0) = -100.08; Likelihood ratio test = 18.1592***; * coefficient significant at 10%; *** coefficient significant at 1%
Source: Field Survey, 2015

responsibilities and hence not will to pay a premium for the safety of buka foods.

Income from primary occupation (university work) significantly influenced the respondents' probability of a yes response to the bid offered for the safety of buka foods. The positive and significant relationship of primary income WTP implies that the higher the income of the respondents from primary occupation, the more likely are they to be willing to pay for safer buka foods. This corroborates the findings of Spencer (1996) and Akinbode (2005) that high income people are generally willing to pay more because they put higher value on their life (valuation of life). Liu et al. (2009) in a food safety study conducted in China equally find a positive relationship between consumer's income and WTP for additive-free moon cakes.

CONCLUSION AND RECOMMENDATIONS

The results of this research indicated that the respondents generally showed great concern for the safety of foods they consume. This was reflected from the large number of respondents that were willing to pay for the safety of buka foods with a mean WTP of ₦32.5 ($0.16) reflecting the prevailing situations in Nigeria and the valid exchange rates in 2015 when the data were collected. The study showed bid amount offered, household size, and income from primary occupation and commuting time were the factors that significantly influenced the probability that the respondents will be willing to pay a premium for food safety. Based on the findings, the study shows that the respondents with larger families are less willing to pay for the safety of buka foods. The government through her regulatory agencies such as the National Agency for Food and Drug Administration and Control (NAFDAC) should help to enforce the necessary standards procedures that buka foods operators will follow to ensure the safety of buka foods. Buka foods operators on the other hand should be informed that consumers are willing to pay a premium to ensure the food they consume is safe hence should abide to the procedures to ensure individuals consume safe food for a healthy wellbeing.

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