

## Quality and Safety Awareness of Ready-To-Eat Foods among Rural Households in Yewa Communities of Ogun State, Nigeria

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**Abstract:** More often than not, intervention programmes of developing nations on access to calorie-based foods against hunger and malnutrition supersede those designed to ensure the quality and safety of food. Thus, advocacy for food adequacy takes pre-eminence over food quality and safety. Food hazards can arise at various stages of the food chain, from primary production to consumption, and climate change may have unpredictable impacts on their occurrences. This study had analyzed the quality and safety awareness of ready-to-eat-foods among rural households in the Yewa communities of Ogun State, Nigeria. It was based on primary data obtained in a cross-sectional survey of 240 respondents drawn by multi-stage sampling technique across ten communities in the study area, using a set of pre-tested structured questionnaire. Data were obtained on households' socio-economic characteristics, their response behaviour to food quality and safety awareness, and food consumption expenditures, and were analysed using simple descriptive tools, probit and ordinary least-square regression techniques. From the results obtained, respondents' mean age, household size and annual income were 41 years, 5 members, and ₦249,167 respectively. 70% of the respondents were male, informally engaged (68%), with an average of 4 years formal education. With respect to food safety awareness, 79%, 76% and 58% of the household heads hardly confirmed expiration dates or damages on food packs, nor followed manufacturers' instructions before consuming packaged foods. Thus, almost 79% of the respondents disagreed that packaged foods were no longer safe for consumption after expiration, but agreed that refrigeration keeps cooked food safe, while 86% of them emphasized the need to ascertain the source(s) of foodstuffs. As for food quality awareness, 91% of the respondents were concerned about the cleanliness of food preparation sites while 98% always examined food packs

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to discover damages on the seal. About 83% of the respondents usually discarded mouldy portions off rotten foods; 61% regularly consumed rotten food so far they were cheap and affordable, while 60% never bothered to pre-taste food leftovers to ascertain their quality status before consumption. Result of the probit regression showed that higher educational attainment (0.049;  $p < 0.05$ ), formal sector job engagement (0.162;  $p < 0.10$ ), household's out-sourced food budget (0.473;  $p < 0.05$ ) and foodstuff importation practices (0.413;  $p < 0.05$ ) increased the probability of household being conscious of safety practices on foods consumed away from home, while spouses' income (-0.573;  $p < 0.01$ ) and large healthcare budget (-0.386  $p < 0.01$ ) decreased it. Factors that enhanced households' consumption expenditure on packaged foods include increased household head income (0.692;  $p < 0.01$ ), large household size (0.204;  $p < 0.05$ ), educational attainment (0.359;  $p < 0.01$ ) and the proportion of infants in the household (0.398;  $p < 0.01$ ). Prioritising intervention programmes to promote higher educational attainment and access to formal-sector employment opportunities were recommended to increase quality and safety consciousness of the rural households to packaged foods.

**Keywords:** Food quality; Safety awareness; Ready-to-eat food; Rural households; Nigeria

**JEL Classification:** I31; O13; Q18

## 1. Introduction

Food is any substance which when consumed provides nutritional support for the body. It may be of plant or animal origin, containing the known five essential nutrients namely, carbohydrates, fats, proteins, vitamins and minerals. Usually after consumption, food undergoes different metabolic processes that eventually lead to the production of energy, maintenance of life, and/or stimulation of growth (Angelillo et al., 2001). The history of early man shows that, people obtained food substances through hunting, gathering, and agriculture. The assurance and protection of food quality has always been important to man. Right from the garden of Eden, there was a law guiding the consumption of food, and in our time too, governments over many centuries have endeavored to make provisions for the safety and wholesomeness of man's food through legal means (Jango-Cohen, 2005; Ismail et al., 2001).

The term 'ready-to-eat-food' is referred to as food and beverages prepared, packaged and sold by vendors on the streets or at other public places, which are either consumed on the spot or taken away for consumption at a later time without further processing, cooking or preparation (WHO, 1996; Badrie et al., 2006). However, the terms 'ready-to-eat-food', 'food-away-from-home' and 'packaged foods' are used interchangeably in this study since in many cases, such foods (especially when purchased on the streets) are often not consumed on the spot but are taken back home or to the work place for consumption. In that sense therefore, even if such packaged, ready-to-eat-foods are purchased away from home but taken back home for consumption, it is still regarded as food-away-from-home in this study.

The commitment of most local economies at promoting industrial development projects had brought about new systems of employment and engagements, with people increasingly working far away from home thereby making the demand for ready-made, packaged food products almost inevitable (Aygen, 2012). Food vendors

are noted for selling foods and drinks at reduced prices, so providing more affordable means for people to obtain nutritionally balanced meals outside the home (Li-Cohen & Bruhn, 2002). Convenience curbside products consumed away-from-home are now responsible for up to ten percent of total sales for some establishments in the more advanced developed nations (Rimal et al. , 2001). In essence, “restaurants have become places to purchase food to eat somewhere else” (Food Institute Report, 2007).

Although street foods have become an indispensable part of both urban and rural diets, some public health risks are associated with the consumption of street food in developing countries. While it is expected that street food meets the nutritional needs of consumers, it is also necessary to ensure its safety from contamination by microorganisms (Chakravarty, 2001). As consumers’ demand for food-away-from-home increases annually, with it arises several concerns about public knowledge of safe food handling behavior of the producers. For instance, Binkley and Ghiselli (2005) reported that increased demand in food-away-from-home is accompanied by the increasing risk of food borne illnesses. In spite of proper sanitary practices by food service personnel, once packaged food has left the establishment, consumers must rely on their own food safety knowledge and the integrity of the packaging agent to prevent contamination of the product.

Food quality and safety are twin-terms that describe the totality of the food characteristics that bear on their ability to satisfy all legal, customer and consumer requirements (Will & Guenther, 2007). Food safety is a scientific discipline describing the handling, preparation and storage of food in a way that prevents food-borne diseases. It is defined as the degree of confidence that food will not cause sickness or harm to the consumer when it is prepared, served and eaten according to its intended use (FAO/WHO, 2003; Binkley & Ghiselli, 2005). In related term, food safety has been defined by FAO/WHO (2001) as the assurance that food will not cause any harm to the consumers when taken in its current state and as it is. To this extent, the World Health Organisation (WHO) recognized food safety as an essential public health issue requiring top priority in the policy agenda of various relevant government agencies and thus adopted the Global food safety strategy (WHO, 2002).

Food quality includes all attributes of food products that influence their value and acceptability to customers, while food safety includes all measures intended to protect human health upon food consumption (Nelson, 2005). Climate change and variability, socio-economic and technological development, urbanization and agricultural land use are among the multiple factors that can provoke changes in the nature and occurrence of food safety hazards. These hazards can arise at various stages of the food chain, from primary production to consumption, and climate change may have direct and indirect impacts on their occurrences. It is the probability of a consumer not contacting a disease as a direct consequence of

consuming certain food products. Previous studies (e. g, Mederios et al. , 2001) have proved that packaged foods can be mishandled at a number of places during food preparation, handling and storage, and consumers have inadequate knowledge of the required measures for preventing food borne diseases in the home.

According to Mederios et al. , (2001), many cases of reported outbreaks of food borne diseases in homes have been caused by contaminated raw foods, inadequate cooking, and consumption of food from unsafe sources. To corroborate this fact, a study by Redmond and Griffith (2002) show that consumers have inadequate knowledge about measures needed to prevent food borne illnesses in the home and hence, between 50% and 87% of reported food borne disease outbreaks in homes have resulted from severely contaminated raw foods and consumption of food from an unsafe sources.

In the face of widespread poverty and malnutrition in developing countries, programs directed towards the promotion of adequate access to food calorie needed to minimize hunger and malnutrition have precedence over those designed to ensure wholesomeness and quality of food. This study therefore aims at assessing the response behaviour of members of the rural households to quality and safety awareness of ready-to-eat foods in selected communities in Ogun State, Nigeria, and also determined the extent of consumers' acclaimed consciousness towards safety practices of packaged food products among the rural households.

## **2. Conceptual Framework**

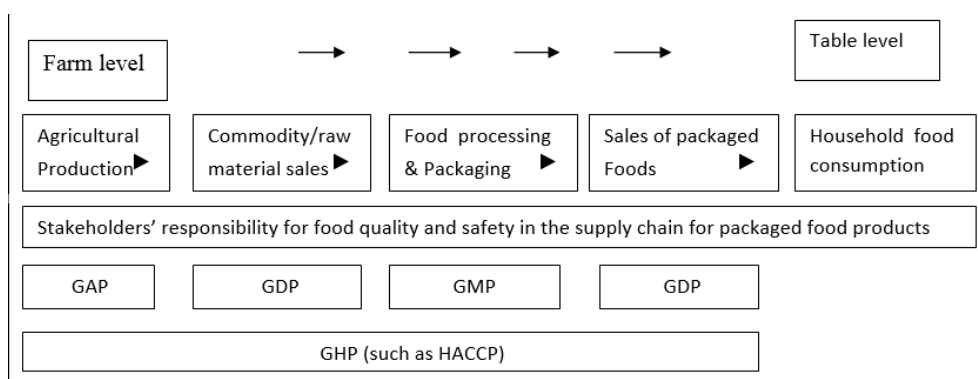
### **2.1. The Supply Chain for Packaged Foods**

As highlighted in figure 1, every stakeholder in the food supply chain has to apply good and standard practices which eventually culminate into food quality and safety. The food chain in this context refers to the full range of activities that all concerned stakeholders do to bring a product (the packaged, ready-to-take food) from its conception to its end users. Stakeholders in this food supply chain are the chain operators (including the farmers, the food processors, the middlemen, and the consumer); the chain supporters (the service providers); and the chain enablers (the policy makers and food regulatory agencies). The primary responsibility for the safety of packaged foods therefore lies with the farmers who produce the raw foodstuffs, the processors, the distributors (dealers in foodstuffs) and the final consumers (household members in this case) (WHO, 2002).

As expected, farmers and processors at the primary level must be willing to adopt Good Agricultural Practice (GAP); sellers of foodstuffs and other middlemen must be willing to adopt Good Distribution Practices (GDP) while manufacturers must adopt Good Manufacturing Practices (GMP). All these individual best practices

when put together represent Good Hygiene Practices (GHP) which are very key to achieving Hazard Analysis and Critical Control Points (HACCP) standards in the farm-food industries. Generally, successful application of the HACCP principles has suffered a lot of setbacks in many developing economies due to the well segregated and numerous informal food markets (Nwagi et al. , 2000). According to World Bank (2005), there is very minimal awareness and application of basic hygienic practices among local food handlers (the farmer, the processor, and the various distributors) and the ultimate consumers.

Farmers, being a key food supply chain operator, ensure food quality and safety by choosing the approved best practices to produce foodstuffs that serve as raw materials in producing packaged/ready-to-eat foods, as required by GAP. These best practices are in the areas of choosing the right seed, good land cultivation and management practices, good weed, pest and disease control practices, among others. Food processors in Ogun State must be willing to adopt good manufacturing practices (GMP) through proper raw material handling and control. Uniform and accurate weights and measures of food ingredients are very essential to trade with goods (Lasztity et. al. , 2004), and as indicated in recipes, these affect the quality and safety of processed and packaged foods. Both the small-holder farmers and processors are often supported financially by their self-help cooperative organizations and micro-finance institutions within their localities.



**Figure 1. Food Supply Chain from Farm Level to Table Level**

*Source: Adapted from Will and Guenther (2007) and modified to suit this study*

Consumers are involved in the food supply chain by virtue of appropriate product selection and purchase, product storage, preparation, consumption and proper disposal of household waste (Will & Guenther, 2007). Customers in Nigeria (and particularly Ogun State in this case) are expected to ensure that factory-manufactured packaged, ready-to-eat food products meet the minimum safety standards as required by the Standards Organisation of Nigeria (SON) and the National Agency for Foods, Drugs Administration and Control (NAFDAC). As is obtained in many developed

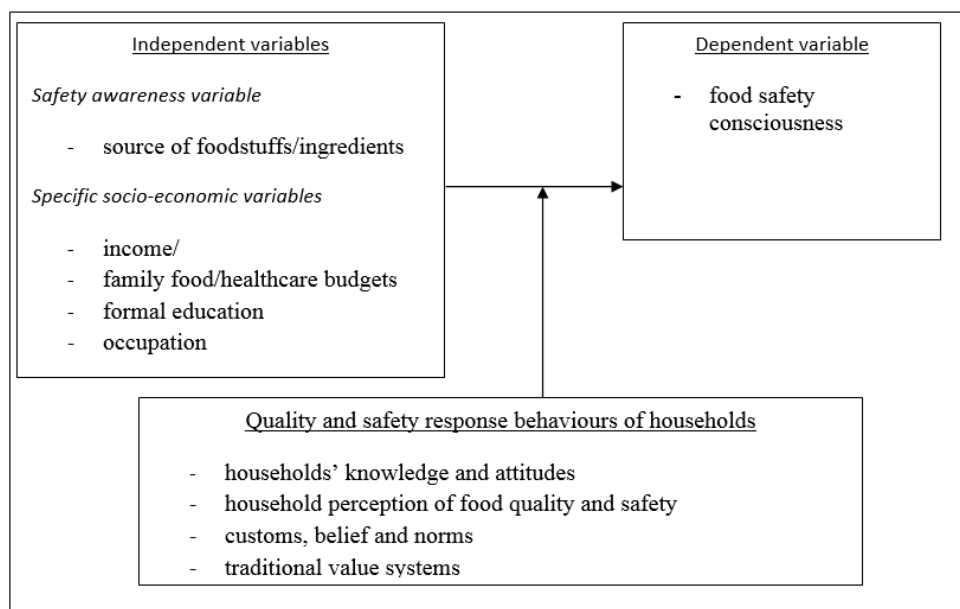
countries of the world, these organizations aim to protect consumers against unfair trade practices and purchase of unsafe or sub-standard food products. This participatory role in enforcing the safety rules they enforce by taking their time to read and understand the labels on the packaged food products to confirm that the ingredients used are right and health friendly, and that the content is not expired as at the time of purchase and consumption. Customers should also look for stated directions on any preliminary steps/precautions to take in case of damages noticed on the seal or pack, or suspected poisoning arising from consumption of contaminated food products.

The role of government and other regulatory agencies as the chain enablers include enforcing the right environment for safe and standardized food products to thrive through their various political, economic and legislative intervention frameworks. These ensure proper regulation of other food supply chain operators in the economy. Agencies of the Nigerian government in this regards include the Standards Organisation of Nigeria (SON) and the National Agency for Foods, Drugs Administration and Control (NAFDAC) working hand-in-hand with the relevant law enforcement agencies, such as the Nigeria Police, the Nigerian Civil Defence Corps (NCDC) and the health-sector workers. Also in the category of food chain enablers are the various public educational institutions such as Universities, Polytechnics, Colleges of Education, Technical Colleges and Institutes saddled with the responsibilities of training students in Food Science and Technology at degree, diploma, certificate and vocational levels. Such institutions in Ogun State within the reach of household members in the study area include Federal University of Abeokuta and the Yewa Campus of Olabisi Onabanjo University specifically running degree programmes in Home Science and Hospitality Management with speciality in Food Sciences. Others are Federal College of Education, Abeokuta, and the Federal Polytechnics, Ilaro.

## **2. 2. The Food Quality and Safety Interdependence Framework**

According to the WHO (2000)'s global food safety strategy, traditional food safety management systems have not been effective in preventing food-borne diseases in many developing economies over some decades. The required strategy therefore, is the adoption of policies that advocate food safety programmes based on a broader science-based concept of risk assessment, risk management through process controls along the entire production chain and risk communication. This is a farm to table approach that involves considerations of every step in the food value chain, the entire community and all actors in the food industry, including the farmers, food processors, and farm produce/product distributors until it gets to the final consumers. This strategy also advocates sustainable agriculture production systems and redirection of some of the existing approaches to ensure they meet the challenges of global food safety practices as provided by WHO (2002). This food safety

interdependence framework was developed from reviewed literature on knowledge of food safety standards and practices as illustrated in figure 2.



**Figure 2. The Food Quality and Safety Interdependence Framework for Ready-to-Eat Foods Products**

*Source: Adapted from Kioko (2012) and Modified to for this study*

### 3. Research Design and Method

#### 3.1. The Study Area

This study was carried out in the Yewa division of Ogun State, Nigeria, comprising of five (5) local government areas namely Yewa North (<sup>1</sup>Ayetoro), Yewa South (Ilaro), Imeko/Afon (Imeko), Ipokia (Ipokia) and Ado-Odo/Ota (Ota). Ogun State is in the South-West rain forest zone of Nigeria, lying within latitude 6. 2<sup>0</sup>N and 7. 8<sup>0</sup>N and longitude 3. 0<sup>0</sup>E and 5. 0<sup>0</sup> E. The two local government areas border the Republic of Benin in the West, with their headquarters towns at Ilaro and Ipokia, respectively. The major crops grown among the Yewa communities are cassava, yam, maize, melon, cocoyam, spices, vegetables and fruits, as well as cocoa, oil palm, and kola nut. Common livestock are also reared such as goat, sheep, poultry, and cattle.

<sup>1</sup> The headquarter town of each of the five LGAs is in parenthesis

### **3.2. Data Type, Data Source and Data Collection Technique**

A multiple-item written questionnaire was modified following the version adopted by Nurhan (2007), and minor modifications were made on the set of questions after they were pilot-tested on few household heads randomly selected from a section of the study area. The final version captured questions that bordered on demographic factors, food quality and safety behaviors, and food quality and safety awareness of the targeted respondents. Primary data were collected from household heads with the aid of the pre-tested questionnaires. Household heads were targeted because they were in position to provide information on the food consumption pattern of other members of the households being the bread winner. Specific information were obtained from the respondents on the quality and safety of the packaged food that were prepared outside the homes for either home or out-of-home consumption, as well as the extent of consumption of those food types.

### **3.3. Sampling Techniques**

A multiple-stage sampling technique was employed in selecting the respondents. At the first stage, two of the five local government areas (LGAs) in the division were purposefully selected on the basis of their possession of characteristics capable of promoting the prevalence of food-away-from-home/package foods in a community. Notable among such characteristics is the availability of higher institution of learning in the headquarter town of both LGAs (a campus of the Olabisi Onabanjo University situated at Ayetoro and the Federal Polytechnics located at Ilaro) which promotes the concentration of undergraduate students in the two towns and their neighbouring communities. At the second stage, five (5) major communities were randomly selected in each of the two local government areas, namely Ayetoro, Igbogila, Ibooro, Sawonjo and Saala-Orile in Yewa North LGA; and Ilaro, Owode, Erinja, Oke-Odan, and Ajilete in Yewa South LGA. At the third stage, five (5) housing units (HUs) were selected in each of the towns, from which five (5) households were drawn per HU in the final stage. Thus, a total of 250 household heads were sampled from the study area but in all, a total of ten questionnaires were not discarded for incomplete information.

### **3.4. Estimation Procedures**

#### **3.4.1. Response behaviour of rural households to quality and safety practices of packaged foods**

Descriptive tools were employed to analyse the response behaviour of household heads to food quality and safety practices. Household heads were asked to respond to pre-tested questions reflecting their knowledge, attitudes and behaviours to food quality and safety practices, using a calibrated scale 1–5. For food quality and safety awareness, the scale used was: 1= “always, 2= “occasionally”, 3= “rarely,” 4= “never”. For food safety practice knowledge, the scale was constructed thus: 1 =



“strongly agreed”; 2 = “agreed”; 3 = “indifferent”; 4 = “disagreed”; and 5 = “strongly disagreed”.

### 3.4.2. Determinants of household’s consciousness of the safety status of packaged foods

The factors affecting the extent of households’ consciousness about food safety status were analyzed using the probit model. The probit model is a discrete choice model, the parameters of which are nonlinear. The objective of this model was to relate the choice probability  $P_i$ , which is the dependent variable, with the hypothesized explanatory variables in such a way that  $P_i$  will be 0 or 1. In the probit model, a benefit index  $I_i$  was developed for each observation, thus:

$$I_i = \beta_1 + \beta_2 x_{i2} + \dots + \beta_k x_{ik} \quad (1)$$

By implication, the higher the value  $I_i$ , the higher the benefit obtained by the  $i$ th individual for the choice of  $y_i = 1$ . The general form of the probit model is presented thus:

$$P_i = F(I_i) = F(\beta_1 + \beta_2 x_{i2} + \dots + \beta_k x_{ik}) = F(x_i' \beta) \quad (2)$$

where  $P_i$  = household head’s food safety consciousness ( $P_i=1$  if household head is food safety conscious; 0 otherwise). The concern of the  $i$ th household head for food safety practices is as stated in a simple ‘yes’ or ‘no’ response to the question of whether or not the respondent is often conscious of some stated minimum best practices with regards to the safety of foods consumed away from home.

$F(I_i)$  is the cumulative probability function of the standard normal (0,1) random variable  $I_i$ .

$\beta_i$  = regression coefficients ( $i=1, 2, 3 \dots 12$ )

$x_i$  = independent variables ( $i=1, 2, 3 \dots 12$ ) hypothesized to influence the  $i$ th household head’s

stated concerned for the safety of foods consumed away from home, where:

$x_1$  = income of household head (€/annum)

$x_2$  = income of spouse (€/annum)

$x_3$  = age of household head (years)

$x_4$  = gender of household head (male = 1, female= 0)

$x_5$  = type of occupation of household head (formal sector job = 1, 0 otherwise)

$x_6$  = household size (number)

$x_7$  = years of formal education of household head

$x_8$  = years of formal education of spouse

$x_9$  = household budget on health care (₦/annum)

$x_{10}$  = household budget on food (₦/annum)

$x_{11}$  = number of household members aged 60 years and above

$x_{12}$  = number of household members aged 12 years and below

$x_{13}$  = source of foodstuffs/ingredients (1 if imported, 0 otherwise)

#### 3.4. Consumption pattern of packaged foods among sampled households

Multiple regression analysis was used to determine the pattern of consumption of packaged foods among the surveyed households. The consumption model is thus specified:

$$Y_i = f(\beta_i X_i) + \mu_i \quad (3)$$

where:

$Y_i$  = household's consumption expenditure on packaged foods (₦/annum)

$X_1$  = income of household head (₦/annum)

$X_2$  = income of spouse (₦/annum)

$X_3$  = gender of household head (1 = male; 0 otherwise)

$X_4$  = age of the household head (year)

$X_5$  = household size

$X_6$  = years of formal education of household head

$X_7$  = years of formal education of spouse

$X_8$  = number of household members aged 60 years and above

$X_9$  = number of household members aged 12 years and below

$X_{10}$  = primary occupation of household head (non-farming =1, otherwise =0)

$\mu$  = error term

## 4. Results and Discussion

### 4.1. Socio-economic characteristics of the sampled rural households

The socio-economic characteristics of the sampled respondents were as presented in Table 1.

**Table 1. Distribution of Respondent Household Heads by Socio-Economic Characteristics**

Characteristics	Frequency	Relative percentage
<i>Age (household head)</i>		
< 30	74	30.83
30 – 60	156	65.00
> 60	10	4.17
<i>Total</i>	<i>240</i>	<i>100.00</i>
		<i>(Mean age: 41 years)</i>
<i>Gender</i>		
Male	168	70.00
Female	72	30.00
<i>Total</i>	<i>240</i>	<i>100.00</i>
<i>Type of job engagement</i>		
Formal sector	78	32.50
Informal sector	162	67.50
<i>Total</i>	<i>240</i>	<i>100.00</i>
<i>Education</i>		
No formal education	36	15.00
Primary education	130	54.17
Secondary education	70	29.17
Tertiary education	4	1.67
<i>Total</i>	<i>240</i>	<i>100.00</i>
		<i>(Average years of schooling: 4 years)</i>
<i>Annual household income (€)</i>		
< 200,000	138	57.50
200,000 - 400,000	86	35.83
>400,000	16	6.67

<i>Total</i>	240	100.00 (Mean annual income: ₦249,167)
<i>Household size</i>		
< 3	72	30.0
4-6	134	55.83
> 6	34	14.17 (Mean household size: 5)
<i>Total</i>	240	100.0

Source: computed from field survey, 2015

From the result, the mean age, household size and household income were 41 years, 5 members and ₦249,167 per annum, respectively. Seventy percent (70%) of the respondents were male, majority of whom had a maximum of primary school education, and mainly engaged in informal sector jobs, mainly crop farming.

#### 4.2. Response Behaviour of Household on Food Safety Awareness

Table 2 showed the responses of the respondents with respect to their household's behaviour towards food quality awareness. It is very obvious from the table that majority of the sampled respondents paid attention to the safety status of packed/package foods. About 79% of the household heads hardly bothered to check the expiration date before purchasing packaged foods to ascertain that the commodities were still safe for consumption while as much as 76% of them rarely checked to detect damages on food packs before purchase or consumption. However, about 58% of the respondents hardly followed manufacturers' instructions on food packs before consumption. These results are in consonance with the findings of Meer and Misner (2000) and Cody and Hogue (2003).

**Table 2. Response behaviour of household to the safety of packaged foods**

Purchasing behaviour of household to food safety awareness	Always	Occasional	Rarely	Never
Expiration dates on packaged foods are checked before purchases are made	8 (3.3%)	42 (17.5%)	175 (72.9%)	15 (6.3%)
Food packs/cans are checked if they have been pre-opened or damaged before purchases are made	42 (17.5%)	16 (6.7%)	182 (75.8%)	0 (0%)
Manufacturers' instructions on food packs are followed in product consumption	18 (7.5%)	84 (35%)	118 (49.2%)	20 (8.3%)
Only packed/package foods that are free from preservatives/artificial colouring are patronised	124 (51.7%)	48 (20.0%)	58 (24.2%)	10 (4.2%)

Unfinished packaged foods are preserved to prevent deterioration	112 (46.7%)	56 (23.3%)	44 (18.3%)	28 (12%)
Attentions are given to the hygiene of the places where prepared foods are purchased for home consumption	224 (93.3%)	16 (6.7%)	0 (0%)	0 (0%)
Attentions are given to the odour, colour and general appearance of packed foods before buying/eating	150 (62.5%)	58 (24.2%)	18 (7.5%)	14 (5.8%)

*Source: computed from field survey, 2015*

*(Figures in parentheses are the relative percentages)*

Almost 52% of the respondents always made sure that the packed/package foods they patronised were free from artificial pigments, while about 28% hardly bothered about this. Almost 70% of the respondents regularly preserved unfinished packaged foods to prevent deterioration while about 87% of them paid adequate attention to the odour, colour and general appearance of packed/package foods before they were bought/eaten.

#### **4.3. Response behaviour of household on food quality awareness**

Table 3 summarizes the responses of the respondents with regard to the safety rules of handling packaged foods. Most of them cared about the general hygiene rules for preparing foods they would like to patronise (as observed by Jevšnik et al. , 2008). About 91% of the respondents always checked the cleanliness of the surfaces where packaged foods were prepared while 7.5% of them do so occasionally. Nearly all (about 98%) of the respondents always examined food packs to ensure they were not partially opened or damaged before they are purchased. However, only a handful of the respondents cared about the quality state of the packaged foods they consumed. For instance, from Table 3, it is revealed that as much as 83.4% of the respondents would only scrap or cut off the mouldy portions of rotten foods and then consume the unaffected portion; 60.8% of them regularly consumed rotten food ingredients as long as they were cheap and affordable to them; and yet about 60% would not bother to pre-taste food leftovers to ascertain their quality status before they were consumed.

**Table 3. Response behaviour of household to food quality awareness**

Response behaviour of household to food quality status	Always	Occasionally	Rarely	Never
The hygiene of the surfaces where home foods are prepared is of utmost importance to my household	218 (90.8%)	18 (7.5%)	4 (1.7%)	0 (0.0%)
Rotten food ingredients are consumed so far they are cheap	24 (10.0%)	122 (50.8%)	64 (26.7%)	30 (12.5%)
Food packs are examined to ensure they are not pre-opened or damaged	234 (97.5%)	6 (2.5%)	0 (0.0%)	0 (0.0%)
Unaffected part of rotten foods are consumed after throwing away the mouldy portion	8 (3.3%)	32 (13.3%)	46 (19.2%)	154 (64.2%)
Food leftovers are tasted to ascertain safety before further consumption	26 (10.8%)	72 (30.0%)	60 (25.0%)	82 (34.2%)
Foodstuffs are stored away from contaminants	212 (88.3%)	20 (8.3%)	0 (0.0%)	8 (3.3%)

*Source: computed from field survey 2015*

*(Figures in parentheses are the relative percentages)*

#### **4.4. Response behaviour of households on food safety practices**

Table 4 presents the responses of the surveyed households with respect to knowledge of food safety practices in the study area. The stated responses showed mixed positions of the household heads on the knowledge of food safety practices. Forty-five percent of them were indifferent as to the fact that fresh foodstuffs are safer than frozen ones even if they are more costly. About 79% of the respondents disagreed that packaged foods are no longer safe for consumption once the expiry date lapses as indicated on the labels. This result further corroborates the likely disregards of the surveyed households to the safety status of packaged foods with respect to safety instructions contained on the foods labels (such as food expiration and damages on seals) as reported on Table 2.

**Table 4. Response behaviour of households on knowledge of food safety practices**

<b>Food safety knowledge</b>	<b>Strongly agreed</b>	<b>Agreed</b>	<b>Indifferent</b>	<b>Disagreed</b>	<b>Strongly disagreed</b>
Freezing foods kills germs that may cause illness	118 (49.2%)	46 (19.2%)	16 (6.7%)	50 (20.8%)	10 (4.2%)
Fresh foods are safer than frozen ones even if they are more costly	4 (1.7%)	62 (25.8%)	108 (45%)	54 (22.5%)	12 (5.0%)
Refrigeration helps to keep cooked foods safe and prolonged	116 (48.3%)	112 (46.7%)	12 (5.0%)	0 (0.0%)	0 (0.0%)
Packaged foods are no longer safe for consumption once the indicated expiry date lapses	36 (15.0%)	10 (4.2%)	0 (0.0%)	190 (79.2%)	4 (1.7%)
Food contaminants may introduce toxins to the body system	104 (43.3%)	112 (46.7%)	22 (9.2%)	2 (0.8%)	0 (0.0%)
To curb obesity it is safer to avoid packaged foods with high calorie content	60 (25.0%)	150 (62.5%)	30 (12.5%)	0 (0.0%)	0 (0.0%)
Washing hands before and after eating reduces the incidence of disease attack	162 (67.5%)	78 (32.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Packaged foods must be examined before they are opened	138 (57.5%)	82 (34.2%)	8 (3.3%)	8 (3.3%)	4 (1.7%)
It is very important to ascertain the source(s) of foodstuffs	132 (55.0%)	72 (30.0%)	16 (6.7%)	16 (6.7%)	4 (1.7%)

*Source: computed from field survey 2015*

*(Figures in parentheses are the relative percentages)*

However, most of the respondents (95%) alluded to the fact that refrigeration helps to keep cooked food safe always, corroborating the findings of Lando & Fein (2007) and Odwin & Badrie (2008). Similarly, 87.5% of the respondents agreed that it is safer to avoid packaged foods with high calorie content in order to curb obesity. All the respondents agreed that washing of hands before and after eating reduces the incidence of disease attack. Majority (85.5%) of the respondents also emphasized on the need to ascertain the source(s) of all foodstuffs, especially packaged/frozen foods. This confirms the study by Knight et al. (2003) that most customers would prefer supermarkets items because of the multiple shopping choices, ambiance, and easier personal inspection these facilities provide.

#### 4.5. Determinants of household's consciousness of the safety status of packaged foods

As evidence from previous studies (e. g Van Kleef et al. , 2006), demographic factors of the respondents namely household income, primary education of the household head, levels of education, as well as households' budgets on healthcare and packaged foods influenced the extent of consumer safety consciousness of packaged foods in the study area (Table 5).

**Table 5. Factors influencing household's safety consciousness of packaged foods**

Variable	Coefficient	Standard error	t-value
Income (household head)	0. 704	0. 4432	1. 588
Income (spouse)	-0. 5732***	0. 2090	-2. 743
Age (household head)	-0. 285	0. 5258	-0. 001
Gender (household head)	-0. 1072	0. 1612	-0. 665
Primary occupation (household head)	0. 1618*	0. 0867	1. 866
Household size	-0. 2828	0. 2426	-1. 166
Education (household head)	0. 0493**	0. 0221	2. 230
Education (spouse)	-0. 6948	0. 7341	-0. 946
Household budget on health care	-0. 3862***	0. 1170	3. 300
Household budget on food away-from-home	0. 4727**	0. 2096	2. 255
Aged adults in the household	-0. 3226	0. 9859	-0. 327
Children/infants in the household	-0. 1069	0. 4033	-0. 265
Source of foodstuffs	0. 4179**	0. 2013	2. 085

*Source: computed from field survey 2015*

\*\*\*, \*\*, and \* = coefficient is significant at 1%, 5%, and 10%, respectively

As shown on Table 5, higher educational attainment (0. 049;  $p < 0. 05$ ), engagement in formal sector employment (0. 162;  $p < 0. 10$ ), household's out-sourced food budget (0. 473;  $p < 0. 05$ ) and the fact that foodstuff/ingredients used in preparing the food were not sourced locally (0. 418;  $p < 0. 05$ ) would increase the probability of household being conscious of the safety practices on foods consumed away from home as previously discovered in the previous studies of Mason (2001) and Bernudez-Milan et al. (2004). A number of studies have canvassed for the need to sustain consumers' education efforts on the hazards of improper food handling (e. g, WHO, 2000; Li-Cohen & Bruhn, 2002; Mitakakis et al. , 2004; Finch and Daniel, 2005). On the contrary, households in which the spouses also earn income (-0. 573;  $p < 0. 01$ ) and those with high healthcare budget (-0. 386;  $p < 0. 01$ ) would likely be less concerned with safe food practices possibly due to the enhanced capability of the household to cope with the risk of disease attack resulting from food contamination, as confirmed by Acebrón & Dopico (2000).



#### 4.6. Food Consumption Pattern of Packaged Food Among the Rural Households

Table 6 presents the result of the ordinary least-square regression of the factors that determine the consumption pattern of packaged foods among the surveyed households.

**Table 6. Consumption Pattern of Packaged Foods Among Rural Households**

Variable	Coefficient	Standard Error	t-value
Income of household head	0. 692***	0. 210	3. 295
Income of spouse	-0. 066	0. 685	-0. 096
Gender (household head)	-0. 001	0. 006	-0. 166
Age (household head)	-0. 123	1. 470	-0. 084
Household size	0. 204**	0. 101	2. 020
Education (household head)	0. 359***	0. 120	2. 992
Education (spouse)	0. 141	1. 429	0. 099
Aged adults in the household	0. 169	1. 213	0. 139
Children/infants in the household	0. 398***	0. 140	2. 843
Primary occupation (household head)	-0. 052	0. 577	0. 090
<i>R-Square value</i>	<i>0. 873</i>	<i>1. 416</i>	<i>0. 617</i>
<i>Adjusted R-Square value</i>	<i>0. 815</i>	<i>1. 402</i>	<i>0. 581</i>

Source: computed from field survey 2015

\*\*\*, \*\*, and \* = coefficient is significant at 1%, 5%, and 10%, respectively

As *a priori* expected, increased income of the household head (0. 692;  $p < 0. 01$ ), large household size (0. 204;  $p < 0. 05$ ), higher educational attainment (0. 359;  $p < 0. 01$ ) as well as having large numbers of infants as household members (0. 398;  $p < 0. 01$ ) would increase the consumption expenditure of households in the study area. This result is corroborated by the empirical finding of Barclay *et al.* (2001) that educational efforts will support safe and quality food consumption at home and, thus, the continued nourishment and good health status of consumers in the home.

#### 5. Conclusion and Recommendations

This study had analyzed the quality and safety awareness of food-away-from-home among rural households in the Yewa communities of Ogun State, Nigeria using 240 respondents. A survey of the respondents' response behaviour on food quality and safety awareness showed that majority of the sampled respondents paid attention to the safety status of packed/packaged foods. While about 79% of the household heads were not bothered to check the expiration date before purchasing packaged foods, 76% of them hardly confirmed if food packs were damaged before they purchased or consumed packaged foods. Yet about 58% of the respondents hardly followed

consumer's instructions on food labels before they were consumed. About 91% of the respondents were regularly concerned about the cleanliness of the food packaging environment; many were indifferent for mouldy foods, and about 60.8% consumed rotten food ingredients as long as they were cheap and affordable.

Based on the findings of the study, the following recommendations were made, namely:

1. Since higher educational attainment would enhance the safety awareness for packaged foods, access of household members to school should be given much priority. Such educational efforts (as earlier argued by Meer & Misner, 2000) will support safe food handling at home and, thus, the continued independence of consumers in their homes.
2. Access of members of the rural households to formal employment opportunities would be also emphasized in order to enhance their income generation capability, which will help them handle household health risks that may be associated with consumption of unhygienic food products.

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