RESEARCH ARTICLES

Lassa Fever Information, Consumers' Preference and Behaviour: The Case of Cassava Products in Lagos State

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ABSTRACT

The nature of information risk perception influences consumers' food choices and behaviour. Lassa fever and the risk of contracting it have long been in the news and other information sources. This study examines how information about Lassa fever affects consumers' perception of food safety, their preferences and behaviour towards gaari and other cassava products. Information was elicited using a well-structured questionnaire, from Three Hundred and Twenty respondents selected using a multi-stage sampling method for the study. Descriptive statistics such as mean and standard, plus linear and logistic regressions were deployed for the analyses. Results showed that the mean age of respondents was 40.843 and the standard deviation was 13.675. The highest level of their education was 19 years. Respondents were aware of Lassa fever information and the risk of contracting it. Based on this, respondents ranked gaari and cassava products from ogun states (Mean=5.495; SD=1.526) higher than the other four states (Mean between 3.1 and 3.5) on safety. Results further showed that respondents prefered gaari and cassava products packaged ceiled and state-of-original labelled (SOR7). The result of the regression analyses showed that the factors that affect consumers' attitudes toward state-of-origin information and safety labelling, showed that Level of education, Age, Household size, and gender (female) were the significant factors. Regression results also showed that older people tend to care more about SOR7 while consumers with higher consumption care more about Packaging and labelling for food safety. Good processing and storage of cassava products along the value chain and good food safety information management by marketers and government agencies would help to reduce the risk of contracting Lassa fever through gaari and other cassava products in Lagos state.

Keywords: Cassava, Lassa fever, Information, *gaari*, Lagos State

INTRODUCTION

Lassa fever (LF) is an intense viral hemorrhagic fever known to be endemic in a few West African nations, including Nigeria. As of June 9, 2017, a sum of 501 speculated cases, including 104 fatalities, had been advised since the beginning of the momentum Lassa fever episode season, in December 2016. In 2022 alone,

from 3 to 30 January 2022, 211 laboratory-confirmed Lassa fever cases including 40 deaths (case fatality ratio: 19%) have been cumulatively reported in 14 of the 36 Nigerian states. Worthy of note is the known fact of its incidences occurring in majorly agrarian societies, majorly cassava producing belts of Nigeria (Inclusive of Edo, Ondo, Delta, Kogi, Enugu etc. whose major cassava products market is in Lagos) and the Federal Capital Territory across the country (WHO, 2022). The annual peak of Lassa fever cases is typically observed during the dry season (December–April), which coincides with the period of harvesting and processing of cassava products and other farm produce. It has been reported that contamination of whole cassava dry roots is caused primarily by exogenous factors such as bacteria, fungi, insects and rodents. It is known that While fungi growth in dry cassava products happens during processing when slow drying or storage under humid conditions is carried out, resulting in mycotoxins formation, processing of *gaari* (cassava granules), a popular cassava product in Nigeria, (and staple food) involves roasting under intense heat generated by the stove, gas or traditional firewood which hardly condone survival/existent of any pathogens. The food safety issue in *gaari* contamination among the three earlier mentioned is a rodent, which normally happens during storage whether at the consumer's or marketers' custody. The urine of mastomys rat, a rampant rodent in a farming community and food stores in Nigeria has been implicated as a causal factor in the food-related transmission of LF. *Gaari* (cassava granules), a delicacy of many Yorubas of Ijebu dialect, is often soaked in cold water and relished with other proteinous accompaniments without going through heat transformation. Some people take it as *peselu.* Others just mixed it with palm oil or stew. The possibility of this kind of meal, which is very common among the local people in the rural, and peasant in the peri-urban areas constituting a precursor to LF is undeniable. LF is highly contagious and a deadly viral disease. This issue is particularly important in cassava products, as Lagos, as a market/hub is where cassava products from neighbouring states such as Ogun, Edo, Oyo, Osun and Ondo states are sold. Large supplies of cassava products are brought into Lagos state regularly, from these states. Food safety remains of public health concern, ensuring that consumed food substance is in risk-free condition (Ehirim, 2010). Food safety is the guarantee that ingested food does not create any harm to human health and well-being. Various laws and regulations have been enacted over the years to safeguard the safety and hygiene of the nation's food supply (Omojokun, 2013). However, Nigeria's food supply chain is increasingly becoming complex and information about food-related disease gain spread within a short period due to well-established communication networks, posing a significant threat to the economy (Rondon and Nzeka, 2011). The occurrence of the food-borne disease remains an important health issue in

both developed and developing *states*, and LF is particularly because of its endemic nature in Nigeria.

One of the policy challenges is to reduce or block the transmission of LF and make the consumption of cassava products free from fear amid the reported LF pandemic among the general public. Various types of information received by consumers may substantially change consumers' perceptions regarding LF and influence their choices of cassava products, especially *gaari* (cassava granules) consumption accordingly. But, as in the analysis of markets for almost any good or service, understanding the structure of the supply side does not provide enough information to forecast the impacts of changed market conditions. The potential threat to human life makes LF more than a productivity concern.

Conceivably, consumers could largely ignore LF outbreaks. If consumers felt that LF posed little to no risk to their health, they may not substantially alter their cassava product expenditures in response to news about outbreaks. In that case, productivity losses and/or additional disease prevention and control expenses may result in increased market prices for cassava products. On the other hand, if outbreak reports led consumers to significantly change their perceptions of health risks from consuming cassava products, large numbers of consumers could reduce processed cassava consumption or even stop eating cassava products on news of an outbreak. In that case, aggregate demand may fall along with the reduced supply, prices may fall, and direct production losses might account for only a small part of the reduction in cassava product sales.

Thus, information treatment affects consumers' food consumption choices. Peng et al. (2015) pointed out that consumers could easily notice food safety scandals disclosed by the media, which in turn affected their judgment of expected utility and purchase behaviour. This effect may even be more obvious in the case of serious information asymmetry between the public and food manufacturers or regulators. Information treatment would also affect consumer behaviours. Hence, the nature and degree of information risk perception had a direct impact on consumers' choices of consumption preferences (Petrolia, 2016). The transmission and expression of information would also affect the consistency of consumers' choices (Eppink et al., 2019). Sogari et al. (2019) used three different treatments of no-message condition, vitamin information, and fibre information to be allocated to whole-grain macaroni in turn to investigate the effect of whole-grain pasta labels showing health information descriptors on consumers' choices in a campus dining environment. Results show that only information about the benefits of vitamins had a significant impact on the choice

of whole-grain pasta. The probability of choosing this type of pasta was 7.4% higher than without information and 6.0% higher than with fibre information.

When consumers have relevant information, they are more likely to make informed choices (e.g., Cranage et al., 2005; Vlaeminck et al., 2014; Verbeke & Liu and Swallow, 2021). There is a gap in the literature regarding how consumers' perception of LF affects their preference for the state of origin of cassava products, and how consumers' behaviour and perception might be inconsistent, especially in cassava products. This study examines the situation of perception behaviour conflict and discusses some of the characteristics of this inconsistency. It also discusses how information about cassava products and how cassava products consumers' consumption behaviour and perceptions of Lassa fever information affect their attitude toward state-of-origin information and safety behaviour towards *gaari* and other cassava products. Furthermore, this study differentiates consumers' safety awareness toward several specific states and the underlying factors. The general objective of this study was to determine how information about Lassa fever affects consumers' perception of food safety, their preferences and behaviour towards *gaari* and other cassava products.

MATERIALS AND METHODS

The study was conducted in Lagos State, southwestern Nigeria. It is delineated into five administrative divisions, namely, Ikorodu, Ikeja, Epe, Badagry, and Lagos Island, with Ikeja being the capital. The five divisions consist of a total of 20 Local Government Areas (LGAs) and 37 Local Council Development Areas (LCDAs). Two Local governments, namely, Ikorodu and Epe were purposively selected for the study due to their peculiar nature of harbouring both rural and urban sectors, and also known for the production and consumption of cassava products. A total of Three hundred and twenty respondents were randomly selected from the two LGAs in equal proportion one hundred and seventy each. A well-structured questionnaire containing items of multiple-choice questions that seek to elicit information on the socio-demographic characteristics of the respondents' variables such as age, sex, family size and education, the purchase patterns, such as purchase frequency, purchase amount per visit, and total purchase per week. Respondents were requested to indicate if they would prefer that cassava products were packaged and labelled to show their origin and nutrition characteristics. Respondents were also requested to rank the level of importance that they place on the state of origin of cassava products, nutrition characteristics (carbohydrate and protein contents) and food safety, when purchasing *gaari* (cassava granules) and cassava products from 1 to 7, with 1, being the least important and 7 being the most important. Based on another variable revealing whether they ask a question about the state of origin

of *gaari* and cassava products before purchase or not (not reported in the table), we observe some respondents assigned a high rank (4 or 7) on the level of attribute importance but they didn't ask when purchasing the products. We define "inconsistent" for such respondents, and vice versa, for respondents who gave a lower rank (lower than 4) on the question but asked for cassava products' origin when purchasing. The variable "Inconsistency" is 1 when the respondent is inconsistent and 0 otherwise. The questionnaire also ranked the variance of the respondents' safety rank on cassava products from Edo, Delta, Ogun, Ondo and Oyo, five major suppliers of *gaari* and cassava products in Lagos markets. Those who are indifferent about product safety regarding different states will have a smaller variance and those who think products from these states are very different with regards to safety will have a larger variance. Information about the source of food safety was elicited to indicate if the respondent most frequently obtains information on food safety and is aware of the Lassa fever menace, from government agencies such as the National Agency for Food and Drug Administration and Control (NAFDAC), Federal Ministry of Agriculture, other federal government agencies or state governmental agencies, University Scientists/Researchers, Producer Groups, Retailers (e.g., Supermarkets, Grocery) and Consumer Groups. The survey solicited information regarding respondents' purchasing behaviour about cassava products, and preferences for different cassava product attributes (such as fermented *gaari* or *fufu, lafun*, etc). Respondents were asked in the survey to rank the level of importance for the cassava product they purchase to be produced using environmentally sustainable practices (Environ), without modern technologies (Natural) or organic (Organic). Regarding safety, consumers were also asked to indicate the level of safety that they associate with *gaari* and other cassava products produced in different states, measured again with a 1 to 7 rank; 1 being extremely unsafe and 7 being extremely safe. To reduce the number of dummy variables, this paper assumes that each ranking variable takes a value of 1 representing important if the actual rank is above 4 out of 7 (inclusive), otherwise the variable takes a value of 0 representing unimportant. Descriptive statistics of these variables are also presented in Table 1. For Analysis, three econometric models namely, the Logit model, ordered logit model, and Least squares regression model was employed following Wang, Zhang, Ortega and Widmar (2013).

Logit model

Logistic regressions are a useful way of describing the relationship between independent variables e.g., age, income, etc.) and a binary response variable, expressed as a probability, which takes two values, often 0 and 1. The logistic function, like probabilities, always takes on values between zero and one:

$$f(z) = \exp(z)[\exp(z) + 1] \quad (1)$$

The logistic function is commonly used to form the Logit model because it can take as input any value from negative infinity to positive infinity, whereas the output is confined to values between 0 and 1. The variable z represents the exposure to some set of independent variables, while f(z) represents the probability of a particular outcome, given that set of explanatory variables. The variable z is a measure of the total contribution of all the independent variables used in the model. The variable z is usually defined as:

$$z = \beta_0 + \sum_{m=1}^{k} \beta_m X_m \qquad (2)$$

where β_0 is the "intercept", and β_1, β_2,…., β_k are the "regression coefficients" of X_1, X_2…, X_k respectively. Each of the regression coefficients describes the contribution of that corresponding factor. A positive regression coefficient means that the explanatory variable increases the probability of the outcome, while a negative regression coefficient means that the variable decreases the probability of that outcome; a large regression coefficient means that the factor strongly influences the probability of that outcome, while a near-zero regression coefficient means that that factor has little influence on the probability of that outcome. This model was used to analyse objective 2.

Ordered logit model

When the dependent variable takes more than two values, logistic regressions are no longer valid, and the Ordered logit model is often appropriate. In this model, the dependent variable is measured on an ordinal scale, and the ordinal scale represents a measurement of an underlying interval/ratio scale. For example, ordered logit models can be used when the dependent variables take the ordered, yet discrete, categories High, Medium, and Low. In the ordered logit model, there is an observed ordinal variable,

Y. Y, in turn, is a function of another latent variable, Y*, that is not observed. In the ordered logit model, Y* is continuous whose values determine what the observed ordinal variable Y equals. The continuous latent variable Y* has various threshold points. The value of the observed variable Y depends on whether or not Y* has crossed a particular threshold. For example, when s is the number

of different values Y takes, the *i*th observation should follow,

$$Y_{i=1 \ if \ Y_i^* \ is < \tau_1} \qquad (3)$$

$$Y_i = K \ if \ \tau_{k-1} < Y_i^* \leq \tau_{k,} \ for \ K = 2, \ldots . S - 1 \qquad (4)$$

$$Y_i = S \ if \ Y_i^* > \tau_{s-1} \qquad (5)$$

The continuous latent variable Y^* is equal to

$$Y_i^* = \beta_0 + \sum_{k=1}^{m} \beta_k X_{ki} \varepsilon_i \quad (6)$$

The m βs and S-1 τs are the parameters to be estimated. The Probability that Y will take on a particular value is given as,

$$Prob(Y = 1/X) = \frac{1}{[1+\exp(\times\beta - \tau_1)]} \quad (7)$$

$$Prob(Y = K/X) = \frac{1}{[1+\exp(\times\beta - \tau_k)]} \text{ - } Prob(Y = 1/X) = \frac{1}{[1+\exp(\times\beta - \tau_{k-1})]} \text{ for } k=2,., s-1 \quad (8)$$

$$Prob(Y = s/X) = 1 - \frac{1}{[1+\exp(\times\beta - \tau_{s-1})]} \quad (9)$$

Ordered logit regression model was used to analyse objectives 3 and 4.

Ordinary least squares model

When the dependent variable is a continuous quantitative variable, ordinary least squares (OLS) is the most commonly used method for estimating the unknown parameters in a linear regression model. The OLS estimator is consistent when the regressors are exogenous and there is no multicollinearity and is the best linear unbiased estimator when the errors are homoscedastic for cross-sectional data. Each observation includes a scalar response Y and a vector of predictors X. In a linear regression model the response variable is a linear function of the regressors:

$$Y_i = \beta_0 + \sum_{k=1}^{m} \beta_k X_{ki} + \varepsilon_i \quad (10)$$

Where β is the scalar coefficients; ε is the unobserved scalar random variables (errors) which account for the discrepancy between the observed responses and the predicted outcomes. However, if we have a heteroskedasticity problem, then the OLS standard errors of the estimates are biased, and thus we cannot use the usual t statistics or F statistics for drawing inferences. This introduces the robust standard error.

A valid estimator of Var $(\widehat{\beta_j})$ with heteroskedasticity is:

$$\widehat{Var}\left(\widehat{\beta_j}\right) = \frac{\sum \widehat{r_{ij} u_i^2}}{\left[\sum \hat{r}_{ij}^2\right]^2} \quad (11)$$

where $\widehat{r_{ij}}$ is the *i*th residual from regressing x_j on all other independent variables. With this consistent estimate of the variance, the square roots are the robust

standard errors and can be then used for inference. This model was used to analyse objective 1.

RESULTS AND DISCUSSION

Summary of descriptive variables

Table 1 shows the summary of descriptive statistics from the survey used in the analysis. "SOR7" and "SafetyR7" indicate respondents' rank for the level of importance that they place on state-of-origin and food safety, respectively. The mean and standard deviation for "SOR7" and "SafetyR7" were 4.276 and 1.653, and 5.467 and 1.836 respectively. "SafeVar" is the variance of the respondents' safety rank on cassava products from Ogun, Oyo, Edo, Delta, and Ondo, the five major suppliers of *gaari* (cassava granules) and other cassava products in the Lagos market. The mean and standard deviation were 5.467 and 1.836. Pertinent to know that respondents ranked gaari and other cassava products from Ogun state higher (Mean=5.495) than all other states (Mean between 3.1 and 3.5) in Lassa fever-related food safety. "Educ" shows how many years the respondent has received formal education. The data is continuous and computed out of discreet choices made by respondents. The mean was 14.357 and the standard deviation was 2.404. The highest level of education was 19 years, which translates to post-graduate level, using a 6-3-3-4 scale. "GaariConsum" shows the amount of *gaari* the household of the respondent purchase in a typical month in the market (i.e., traditional grocery store or local market), while "CassConsum" shows how much cassava products (for example *lafun*, *fufu*, starch and other varieties of cassava products) the household of the respondent purchase in a typical month in the market. Their mean and standard deviation were 2.991 and 2.848, and 1.798 and 2.452 for *gaari* and cassava products respectively. 12kg was the highest *gaari* and cassava products purchased per month by the respondents. Several variables about the source of food safety and Lassa fever information were included. "GovS" is a binary variable that indicates if the respondent most frequently obtains information on food safety from government agencies such as the National Agency for Food and Drug Administration and Control (NAFDAC), Federal Ministry of Agriculture, other federal government agencies or state governmental agencies. "UnivS", "ProducerS", "RetailS", and "ConsumerS" are binary variables indicating if the respondent most frequently relies on information from University Scientists/Researchers, Producer Groups (e.g., Cooperatives and farmers groups), Retailers (e.g., Supermarkets, Grocery Stores, or local markets etc.), or Consumer Groups (e.g., Consumers Protection Agency, NGOs, etc.) respectively, when obtaining information on food safety. In lieu of changing nutrition patterns and increasing concern about healthy foods today, variables

such as “EnvironR”, NaturalR" and" OrganicR” were included in the survey to elicit information from consumers if they would prefer *gaari* and other cassava products they were buying were produced using environmentally sustainable practices (EnvironR), without modern technologies (NaturalR), or organic (OrganicR). As Table 1 shows, their Mean and standard deviations were 0.763 and 0.425, 0.862 and 0.346, and 0.613 and 0.487 for EnvironR, NaturalR and OrganicR, respectively (Table 1).

Table 1. Descriptive statistics of variables

Variable Code	Brief Explanation	Units	Mean	SD	Min	Max
SOR7	Rank importance of State of Origin	-	4.276	1.653	1	7
SafetyR7	Rank importance of SAFETY label	-	5.467	1.836	1	7
Inconsistency	Inconsistency on SAFETY labels	-	0.399	0.388	0	1
SafeVar	Variance of safety rank for States	-	1.624	1.498	0	7.9
Age	Years of age	Years	40.843	13.675	20	64
Gender	Male 1, 0, otherwise	-	0.481	0.500	0	1
MIncome	Annual income	₦10,000	5.546	4.288	1	24
Educ	Years of education	Years	14.357	2.404	8	19
Household size	Number in a household	-	0.586	1.011	2	8
GaariConsum	Monthly *gaari* consumption	Kg	2.991	2.848	0	12
CassConsum	Monthly cassava Prdts consum	Kg	1.798	2.452	0	12
GovS	Obtain information from govt agencies	-	0.718	0.450	0	1
UnivS	Obtain information from univ researchers	-	0.098	0.297	0	1
ProducerS	Obtain information from producer gr	-	0.080	0.271	0	1
RetailS	Obtain information from retailers	-	0.433	0.496	0	1
ConsumerS	Obtain information from consumer groups	-	0.179	0.384	0	1
EnvironR	Importance of environment sustainability	-	0.763	0.425	0	1
NaturalR	Importance of naturalness	-	0.862	0.346	0	1
OrganicR	Importance of organic	-	0.613	0.487	0	1
STATEL	Importance of state of origin label	-	0.745	0.436	0	1
Package	Importance regarding packaging and label	-	0.722	0.448	0	1
Quality	Importance of quality certification labels	-	0.855	0.353	0	1
Lagos	Safety rank of cassava products from Lagos	-	3.278	1.652	1	7
Ogun	Safety rank of cassava products from Ogun state	-	5.495	1.526	1	7
Oyo	Safety rank of cassava products from Oyo State	-	3.188	1.383	1	7
Edo	Safety rank of cassava products from Edo State	-	3.394	1.502	1	7
Delta	Safety rank of cassava products from Delta state	-	3.315	1.564	1	7
Ondo	Safety rank of cassava products from Ondo State	-	3.549	1.452	7	

This shows consumers prefer cassava products coming from nature-friendly cultural practices over others. Variables such as “Age”, “Male”, and “Household

size" are self-explained demographic variables as shown by their corresponding means and standard deviations (Table 1). The mean annual household income was 5.546 and the standard deviation was 4.288; as calibrated in tens of thousands, the minimum household income was ten thousand while the highest was two hundred and forty thousand nairas. These variables were utilised in the ensuing regression analyses.

Differences in the perception of food safety for different states

To assess the influence of information on consumers' perception of how safe cassava products coming from different states or sources are for consumption (objective 1), the Ordinary least squares model was employed. As the survey revealed, Consumers have different sources for obtaining information on food safety and have different perceptions of the safety associated with *gaari* and cassava products produced in different states based on these sources, which include University scientists/researchers, producer groups, retailers, consumer groups, and government sources. The news or information given out is what forms the basis of opinions consumers have about the safety of food. Since information about Lassa fever incidents and the affected states has been in the air, the food-related incidence has been a concern to everybody. To achieve objective one, the variance of safety, "SafeVar" formed the dependent variable (Those who are indifferent about cassava product safety regarding different states will have a smaller variance and those who think cassava products from these states are very different from regards to safety will have a larger variance), and the independent variables are Age, gender, Educ, household size, GaariConsum, CassConsum, GovS, UnivS, ProducerS, RetailS, and ConsumerS. Table 2 shows that out of the twelve fitted variables, only four were significant and positive namely Age, Male, *Gaari* consumption and Retailers. Positively significant Age indicates older people tend to think there is a bigger difference among different states than their younger counterparts about food safety. This is not surprising as aged people, apart from having current information, are replete with historical facts about many communities and states due to their senescent knowledge.

The significant and positive nature of males showed that males more than their female counterparts think that there exists a big difference among different states in their food hygiene and safety. For *RetailS*, it is expected that consumers who obtain food safety information from retailers instead of other sources will show more diversified rating over the safety of the cassava products from different states because some consumers may choose to disbelieve such information because of the belief that retailers can churn out information to their favour to sell their products while others may believe such information.

Table 2. Safety variance regression model

Variables	Coefficients (β)	Standard Error
Constant	-1373.56	2303.500
MIncome	-0.022	0.022
Age	0.016	0.002 ***
Male	0.012	0.083*
Educ	0.13	0.083
Household size	0.005	0.011
GaariConsum	0.08	0.026 ***
CassConsum	0.047	0.029
GovS	0.184	0.116
UnivS	0.157	0.186
ProducerS	0.058	0.215
RetailS	0.186	0.103 *
ConsumerS.	0.001	0.144
R^2	0.74	
Adjusted R^2	0.72	

Note: robust standard error was used in states Safety Variance Model due to the Heteroskedasticity problem.
*, **, and *** indicate corresponding variable is significant at the 10%, 5% and 1% level, correspondingly.

This is evidenced by the positive significance of *RetailS*. This shows that retailers tend to provide consumers with information about the difference in the safety of *gaari* and other cassava products produced in different states. When consumers obtain knowledge about cassava product safety from sources like this, they tend to believe in this difference, and thus have a larger variance. Fig. 1 shows the clear difference (though trivial) in the distributions of the variance from these two groups of consumers before controlling for other factors. Monthly *gaari* consumption is another significant variable. For *gaari* consumption, the result shows that those who consume more *gaari* per month will have a larger variance regarding different states' cassava products safety. This can be explained by the distinct nature and attributes of *gaari* as they possess different qualities and different tastes (sweet or fermented, tasteless etc.). Consumers may easily find differences between *gaari* and other cassava products produced in different states if they consume more. Thus, the more they consume the more differences they will find in safety issues.

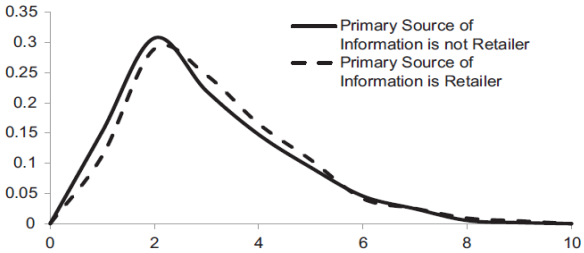

Figure 1. Distributions of the variance of the safety ranking of states by consumers whose primary source of information is from retailers or not

Fray between perception and behaviour model

Consumers may think that "state-of-origin" or source information is important, contradictorily, they may not check or ask a question marketers about "state-of-origin" information when buying *gaari* and cassava products. It is natural to expect those who believe the state-of-origin information is very important to confirm such information when purchasing, and vice versa; especially as it pertains to the ravaging information about Lassa fever. However, there are conflicts between the perception and the actual behaviour of some respondents. We calculate an inconsistency ratio, i.e., the number of inconsistent respondents over the total number of respondents. The survey result shows that out of 320 respondents, 138 have conflicts between perception and their actual behaviour regarding state-of-origin information, making the inconsistency rate 43.02%. This high inconsistency rate suggests that nearly half of the consumers don't check or ask a question about the origin of gaari and other cassava products although they think that state-of-origin (SOR7) is a relatively important attribute in this era. A logit regression of "Inconsistency" on "SafeVar" and demographic variables helps explain the occurrence of this perception behaviour conflict. The result of the analysis is shown in Table 3.

Age is found to be a significant factor in explaining the conflict between consumers' perceptions and behaviour. Older consumers tend to be more consistent regarding perception and actual behaviour. We also find that those who consume more *gaari* will be more consistent while there is a lack of indication that those who consume more of other cassava products will be of the same consistency. Perhaps this may not be far-fetched from the fact that no cassava product is eaten without going through transformation via cooking except *gaari*, because it can be soaked in cold water or chewed as it is; and probably because *gaari* from different states vary widely (for instance, *gaari* from Ogun state are generally desirable for its fermented/sweetness when

soaked in cold water; and has recorded no incidence of Lassa fever) and consumers pay more attention to SOR7 when purchasing *gaari* than they do when purchasing other cassava products.

Table 3. Perception behaviour fray model

Variables	Coefficients (β)	Standard Error	Probability
Constant	-1.373	2.303	1.113
SafeVar	0.159***	0.036	0.264
MIncome	-0.041	0.031	0.561
Age	0.016***	0.000	0.453
Male	0.17	0.083	0.234
Education	-0.13	0.083	1.342
Household size	-0.005	0.011	1.098
GaariConsum	-0.106***	0.027	5.925
CassConsum	0.026	0.017	15.294
Cox & Snell R^2:	0.231		

*, **, and *** indicate corresponding variable is significant at the 10%, 5% and 1% level, correspondingly.

Safety labelling preference

Table 1 show that respondents would like *gaari* and other cassava products packaged and labelled as shown by the mean of the variable- package (0.722). To examine factors that affect consumers' preference for packaging and labelling of *gaari* and other cassava products concerning food safety, the ordered logistic regression was deployed. SafetyR7 was the dependent variable while the independent variables are listed in Table 4.

As Table 4 shows, ten out of fifteen variables fitted were significant. They are: "Inconsistence'', ''SafeVar'', Age, "Educ", Household size, "GaariConsum", "CassConsum", "EnvironR", "NaturalR", "OrganicR" and "QualiR". This means that these factors relate to consumers' perceptions and preferences for the safe packaging and labelling of cassava products. For instance, the positive significance of inconsistencies and safety variance implies the higher the level of inconsistencies and safety variance, the higher the preference for packaging and labelling by consumers of *gaari* and other cassava products. The higher the level of importance consumers place on environmentally friendly cultural practices and the organic nature of cassava produced the more consumers of cassava products would prefer the packaging and labelling of these products. Age is also significant in explaining how consumers will rank the level of importance of packaging and labelling cassava products. The older the consumer

of *gaari* and other cassava products, the higher they would rank the packaging and labelling of *gaari* and cassava products. The higher the monthly quantity of

Table 4. Safety label preference model

Variables	Coefficients (β)	Standard Error	Probability
Constant	-1.583	3.403	1.443
Inconsistency	0.382**	0.045	8.488
SafeVar	0.292***	0.043	0.264
MIncome	-0.041	0.031	0.561
Age	.016***	0.000	0.453
Male	-0.679	0.138	0.234
Educ	0.046*	0.027	1.703
Household size	-0.036**	0.029	1.098
GaariConsum	0.074**	0.029	5.925
CassConsum	0.016*	0.034	1.094
EnvironR	0.392	0.108	3.627
NaturalR	0.413**	0.207	1.994
OrganicR	0.256*	0.144	1.777
PackR	0.798	0.153	5.216
QualiR	0.083***	0.151	0.548
Cox & Snell R^2: 0.431			

*, **, and *** indicate corresponding variable is significant at the 10%, 5% and 1% level, correspondingly

gaari and cassava products consumers purchased, the more they care about whether it should be well packaged and labelled when purchasing *gaari* and other cassava products. This is probably because when people consume more *gaari* and cassava products, their chance of encountering unsafe cassava products will be higher. Increasing news and information about the incidence of a disease that is endemic in a cassava-producing community should trigger a craving for food safety because people are currently very careful with health-related information.

State-of-origin specific safety preference

Table 1 shows that the safety rank of Ogun is 5 on average, while the ranks for all the other five *states* are between 3.1 and 3.5, very close to each other. This indicates that Lagos consumers are sceptical about the safety of cassava products imported from developing countries. Table 3 shows that consumers who believe that there is a large difference in the safety of cassava products produced in different countries will tend not to trust any of the five suppliers of

cassava products except Ogun. For Ogun, the larger the difference consumers think, the more they tend to trust in the safety of gaari and cassava products from the Ogun state. All cassava product suppliers in the Lagos market except Ogun have recorded incidences of Lassa fever. This indicates that Lagos consumers' trust levels in *gaari* and other cassava products from these Lassa fever-prone states are low. Older and female consumers are more sceptical than their counterparts, as indicated by the significant negative age and positive male coefficients. Consumers with higher income would not trust the safety of *gaari* and other cassava products from Edo and Ondo states: except Delta state, there is no clear sign that they would do the same for the other two states. While at the same time, consumers who have received more education in school will tend to believe in the safety of cassava products from Ogun, Oyo, and Delta, but not from Edo or Ondo. The more *gaari* and other cassava products people consume, the more confidence they will place in products from all five suppliers of these products. The only exception is that cassava products consumers' trust in Ogun state products is not much affected.

Table 5. Regression results of safety ranking for states supplying cassava products to the Lagos market

Variable	Ogun	Oyo	Edo	Delta	Ondo
SafeVar	0.91(0.05)***	-0.9(0.04)***	-0.652(0.04) ***	0.89(0.05)***	-1.04(0.05) ***
Age	0.015(0)	0.01(0)	0.003(0)	0.011(0)	-0.009(0)
Male	0.253(0.11)***	-0.377(0.11)***	0.403(0.11)***	-0.517(0.11)	-0.479(0.11) ***
MIncome	-0.015(0.01)	0.027(0.01)***	-0.003(0.01)*	0.033(0.01)**	-0.012(0.01)***
Educ	0.008(0.02)***	0.049(0.02)	-0.082(0.02)	0.061(0.02)***	-0.023(0.02)
Householdsize	0.066(0.06)	0.045(0.06)	0.031(0.06)	0.044(0.06)	0.071(0.06)***
GaariConsum	0.051(0.02)***	0.068(0.02)*	0.075(0.02) **	0.058(0.02) **	-0.081(0.02)
CassConsum	0.061(0.03)	0.064(0.03) *	0.028(0.03)*	0.087(0.03)**	0.071(0.03)
EnvironR	-0.216(0.17)	-0.078(0.17)	0.047(0.17)	0.083(0.17)	0.077(0.17)
NaturalR	-0.3(0.2)	-0.231(0.2)	0.201(0.2)	-0.33(0.2)	0.457(0.2)***
OrganicR	0.126(0.14)	0.18(0.14)	0.053(0.14)	0.082(0.14)	-0.122(0.14)
SOLR7	-0.52(0.15)*	-0.54(0.15) ***	-0.292(0.15)***	-0.228(0.15)	-0.239(0.15)**
PackR	0.34(0.15)	0.411(0.15) ***	0.058(0.14)***	0.259(0.15) *	0.307(0.15)**
QualiR	0.282(0.21)***	0.284(0.21)**	0.643(0.21)	0.402(0.21)*	0.354(0.21)

There are interesting results of the impact on safety ranking from alternative labels. Consumers' preference for state-of-origin information, ceteris paribus, will negatively affect their trust in the safety of most cassava products from the five states. This implies that those who care about SOR7 are usually very cautious and will typically not trust any state regarding safety issues as shown by the negative sign, even cassava products from Ogun and Lagos states.

Consumers who rank the packaging of *gaari* and other cassava products important usually believe the products from almost all five major suppliers are safer. This suggests that packaging is an important role in guiding consumers to believe in the safety of the product. If a supplier of gaari and cassava products can package and put quality labels on them, then will give consumers more confidence in the safety of the products from Ogun, Delta and Oyo. However, this may not be the case for Edo, or Ondo.

SUMMARY

In this study on preferences for different attributes of *gaari* and other cassava products, we have found that information from retailers tends to lead people to believe that there are safety differences among gaari and cassava product products supplied to the Lagos market from different states. The study also found that factors such as consumers' different perception of each state's cassava products' safety, their awareness of whether cassava product is produced using environmentally sustainable practices, whether it is all-natural, or organic, and whether they can be packaged with a quality label, all contribute to consumers' awareness of and emphasis on cassava products' state-of-origin information and safety labels. There were conflicts between the perception and the actual behaviour of some respondents. This study, following Wang *et al* (2013), introduced the concept of the perception behaviour conflict model and explored the characteristics of the inconsistent groups. The inconsistency rate, an indicator of this conflict, suggests that 43.02% of the consumers don't bother about SOR7 information when purchasing *gaari* and other cassava products although they think that SOR7 is a relatively important attribute or vice versa. Preference for state-of-origin labelling and safety labelling were examined. The two attributes are different in that the latter one directly reveals whether cassava product is safe but the former one does not, instead, it implies some safety and other social information. Females and less educated individuals tend to care more about the two attributes than their counterparts. Older people tend to care more about state-of-origin while consumers with more consumption will care more for safety. When studying the five *gaari* and other major cassava products in the Lagos market, the outcomes show that in most cases, older, female, and light cassava products consumers and those who think there exists a large difference among cassava product from different states tend to be more sceptical about *gaari* and cassava products from Edo, Ondo and Delta and Oyo states than the Ogun state. Because consumers who think the packaging is more important tend to trust the safety of these states suggests that more attention be given to the packaging and labelling *gaari* and cassava products. Implications of these results are: One, retailers play important role in *gaari* and cassava products safety, especially as it concerns Lassa fever because of their direct contact with

consumers and can be a very effective information disseminator to them to address consumers' concerns about fear of contamination and or safety of the product, especially those coming other states into Lagos market. Given the outcomes of this study, the government and other sectors, such as universities, should focus on the retail sector to monitor the storage of *gaari* and cassava products to curb mystomis rat contamination during storage and as well disseminate research-based accurate information about food safety to consumers and avoid misleading profit driven biased information. Two, the inconsistency between perception and behaviour contributed by younger consumers, especially the asymmetry toward under-checking behaviour, should be brought to the attention of the public and industry. For safety those who have concerns about gaari and cassava products' possible contamination by mystomis rat (Lassa fever-causing source) should always check for information about it by asking for state-of-origin and storage system used by retailers of these cassava products before purchase, otherwise, they would continue to contribute to this inconsistency. Packaging gaari with appropriate labelling though very new expectations from consumers may help them make better-informed decisions, and thus improve the safety of the *gaari* and other cassava products they choose to consume. Third, other than *Ogun*, consumers were sceptical about the safety of cassava products supplied from the other states considered in this study. Because the *gaari* and cassava products from these states are likely to be a substitute, the issue is how to improve the safety, and resulting reputation and trust of the cassava products from these states. Producers and marketers of *gaari* and cassava products should work to boost the safety and quality of their products, and adopt good storage systems and good information management about Lassa fever causal agents as consumers are now more food safety conscious.

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