Breaking the Bug Barrier: Exploring Cultural and Socioeconomic Factors Influencing Youth Resistance to Edible Insect Consumption in Ibadan, Nigeria

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KEYWORDS

Alternative protein, Barriers, Food acceptance, Dietary habits, Perception,

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ABSTRACT

This study investigated the resistance to edible insect consumption among youth in Ibadan, Nigeria, with a focus on cultural and socioeconomic barriers. Utilizing a cross-sectional survey design, data were collected from 385 participants aged 18-35 years through stratified random sampling. A structured questionnaire evaluated respondents' awareness, willingness to consume, and previous experiences with edible insects. The findings indicate that although 94% of participants were aware of edible insects, actual willingness to consume them was low: only 9.7% in the 18-25 age group and 18.6% in the 26-35 age group expressed a willingness to try. Furthermore, a substantial portion of the youth, 82% in the younger group and 77.9% in the older group, reported no prior experience with edible insects. Among those with prior experience, the willingness to consume insects again was minimal, with only 5.6% of the younger group and 13.7% of the older group showing renewed interest. Logistic regression analysis identified significant predictors of willingness to consume, including age group, level of awareness, and previous experience. These results highlight the critical need to address cultural and socioeconomic barriers through targeted educational programs and community engagement initiatives. Such efforts are essential for improving the acceptance of edible insects, which could contribute to enhanced food security and sustainability as non-timber forest products.

INTRODUCTION

Edible insects have been an integral part of human diets across diverse cultures for centuries, recognized for their substantial nutritional benefits and environmental sustainability (Bessa *et al.*, 2020). In the context of increasing global food insecurity, entomophagy—the practice of consuming insects—is emerging as a viable solution to address the nutritional needs of a growing population (Bao *et al.*, 2022). Insects are rich in protein, fats, vitamins, and minerals, and offer a more sustainable alternative to traditional livestock farming, which is often resource-intensive and environmentally taxing (Traynor *et al.*, 2024). Furthermore, edible insects are considered a nontimber forest product (NTFP), contributing to forest conservation and sustainable livelihoods by providing an additional source of income without depleting forest resources (Akomaning *et al.*, 2020).

Edible insects, traditionally consumed in many African countries including Nigeria, are highly nutritious, offering 60-70% protein, healthy fats like omega-3 and omega-6, essential micro nutrients such as iron, zinc, magnesium, and calcium, and gut-friendly fiber, while also being affordable, environmentally sustainable, fast-growing, and providing economic opportunities through local farming and processing.Yet, this practice is not uniformly embraced across all demographics, particularly among urban youth. Urbanization, globalization, and shifting dietary preferences have significantly impacted traditional food practices, sometimes leading to their decline (Ruel *et al.*, 2017). Investigating these dynamics is essential for promoting sustainable dietary practices and enhancing food security, especially in regions where traditional knowledge and practices are being challenged by modern influences

(Moruzzo *et al.*, 2021). The city of Ibadan, Nigeria, provides a pertinent case study for examining these trends. As one of the largest and most diverse cities in Nigeria, Ibadan represents a microcosm of the broader cultural and socioeconomic shifts occurring across the country. This diversity offers an opportunity to explore the barriers and facilitators influencing the acceptance of edible insects among youth, who may have different attitudes compared to their rural counterparts. Understanding the factors that contribute to youth resistance to edible insect consumption is crucial for developing targeted interventions.

This study aims to assess the awareness, willingness, and experiences related to edible insect consumption among youth in Ibadan. By identifying key factors that affect acceptance, the research seeks to provide insights into potential strategies for promoting entomophagy.

MATERIALS AND METHOD

Study Location

This study was conducted in Ibadan, Nigeria. Ibadan, the capital of Oyo State, is one of the largest cities in Nigeria and West Africa, with a diverse population and varying socioeconomic backgrounds.

Study Population

The study targeted youth aged 18-35 years residing in Ibadan, encompassing a diverse range of educational backgrounds. Participants included secondary school students and individuals from higher institutions, ensuring representation across different academic levels. Youths were selected as the focus of this study because they play a crucial role in shaping future food consumption trends, and their acceptance or resistance to edible insect consumption could significantly influence long-term dietary sustainability and food security.

Study Design and Sample Size

A cross-sectional survey was employed to assess the awareness, willingness, and experience of edible insect consumption among youth in Ibadan. Using a confidence level of 95% and a margin of error of 5%, the required sample size was calculated to be 385 participants.

Sampling Technique

Participants were selected using a stratified random sampling technique to ensure representation across different age groups (18-25 and 26-35). The questionnaire was distributed on a one-on one basis to maximize response rates and ensure the accuracy of data collected.

Data Collection

A structured questionnaire was designed to collect data on demographic characteristics, awareness of edible insects, willingness to try edible insects, previous experience with edible insects, and current willingness to consume edible insects again. The questionnaire included both closed-ended and Likert-scale questions. To provide a comprehensive understanding of edible insect consumption among Nigerian youth, findings from other regions in Nigeria were reviewed and integrated into the analysis. This approach ensured that the conclusions drawn were reflective of broader trends and not limited to the Ibadan study area alone.

Statistical Analysis

Data were analyzed using R version 4.3.0. Descriptive statistics were computed for demographic variables. Chi-square tests were performed to assess the association between age groups and categorical variables: awareness of edible insects, willingness to try edible insects, previous experience with edible insects, and current willingness to consume edible insects again. P-values were reported to assess the significance of the differences. A logistic regression model was fitted to examine the factors influencing the willingness to try edible insects. The dependent variable was willingness to try edible insects (1 = Yes, 0 = No), and the independent variables included age group (1 = 26-35, 0 = 18-25), awareness of edible insects (1 = Yes, 0 = No), and previous experience with edible insects (1 = Yes, 0 = No). The odds ratios and 95% confidence intervals were calculated to interpret the effect of each predictor on the willingness to try edible insects.

RESULTS

The demographic characteristics of the study participants, as represented in Table 1, revealed that the majority were in the 26-35 age group, comprising 60% (n = 231) of the sample, while the 18-25 age group makes up 40% (n = 154). This indicates a higher representation of slightly older youth in the study. The gender distribution is nearly equal, with males constituting 49.9% (n = 192) and females 50.1% (n = 193) of the participants, ensuring that both male and female perspectives were equally represented in the sample. In terms of educational attainment, a significant portion of the participants have tertiary education, accounting for 68.8% (n = 265) of the sample, whereas those with secondary education represent 31.2% (n = 120). This suggests that the study predominantly engaged individuals with higher educational levels. The balanced gender distribution and the educational profile of the participants provide a comprehensive overview of the sample's demographic composition.

Table 1: Demographic Characteristics of the Respondents

Characteristic	Frequency (n)	Percentage (%)
Age Group		
18-25	154	40
26-35	231	60
Gender		
Male	192	49.9
Female	193	50.1
Education Level		
Secondary	120	31.2
Tertiary	265	68.8

Awareness, Willingness, and Experience with Edible Insects by Age Group

The findings regarding awareness, willingness, and experience with edible insects by age group were summarized in Table 2. The table reveals significant differences in attitudes and experiences between the two age groups studied. For awareness of edible insects, a high percentage of participants in the 26-35 age group (97%, n = 224) reported awareness compared to the 18-25 age group (90.3%, n = 139). This suggests that older youth were more likely to be aware of edible insects. In terms of willingness to try edible insects, the 18-25 age group showed a lower willingness, with only 9.7% (n = 15) expressing readiness compared to 18.6% (n = 43) in the 26-35 age group. This indicates a greater openness among the older age group. Regarding previous experience with edible insects, 22.1% (n = 51) of the 26-35 age group reported having prior experience, while only 11.7% (n = 18) of the 18-25 age group did. This showed a higher level of prior experience among older participants. Finally, for current willingness to consume edible insects again, only 5.6% (n = 1) of the 18-25 age group expressed willingness, while 13.7% (n = 7) of the 26-35 age group were willing. This highlights a higher level of current willingness among the older age group compared to the younger one.

Table 2: Awareness, Willingness, and Experience with Edible Insects by Age Group

Variable	Age Group	Yes (n)	Yes (%)	No (n)	No (%)
Awareness	18-25	139	90.3	15	9.7
	26-35	224	97	7	3
Willingness	18-25	15	9.7	139	90.3
	26-35	43	18.6	188	81.4
Previous Experience	18-25	18	11.7	136	88.3
	26-35	51	22.1	180	77.9
Current Willingness	18-25	1	5.6	17	94.4
	26-35	7	13.7	44	86.3

Logistic Regression Analysis of Willingness to Try Edible Insects

The logistic regression analysis of factors influencing the willingness to try edible insects was presented in Table 3. This analysis examined the impact of age group, awareness, and previous experience on the likelihood of willingness to try edible insects. The Intercept of -2.305 (β) indicates a baseline odds ratio of 0.10, with a 95% confidence interval (CI) ranging from 0.04 to

0.22. This suggested that, in the absence of the predictors, the baseline probability of willingness to try edible insects was quite low. The Age Group variable (26-35) had an estimate of 0.790 (β), with a z-

value of 2.303 and a p-value of 0.021. The odds ratio for this variable was 2.20, with a 95% CI of 1.12 to 4.31. This indicated that individuals in the 26-35 age group were 2.20 times more likely to be willing to try edible insects compared to those in the 18-25 age group, and this result was statistically significant. For Awareness of edible insects (Yes), the estimate was 1.126 (β), with a z-value of 2.865 and a p-value of 0.004. The odds ratio is 3.08, with a 95% CI of 1.42 to 6.68 suggested that those who were aware of edible insects were 3.08 times more likely to be willing to try them, which was statistically significant. Previous Experience with edible insects

(Yes) had an estimate of 1.010 (β), a z-value of 2.918, and a p-value of 0.004. The odds ratio was 2.75, with a 95% CI of 1.37 to 5.53. This indicated that individuals with previous experience were 2.75 times more likely to be willing to try edible insects, and this finding was also

statistically significant.

Table 3: Logistic Regression Analysis of Willingness to Try Edible Insects

Predictor	Estimate (β)	Standard Error (SE)	zvalue	pvalue	Odds Ratio (OR)	95% CI (OR)
Intercept	-2.305	0.414	-5.571	<0.001	0.10	0.04 - 0.22
Age Group (26-35)	0.790	0.343	2.303	0.021	2.20	1.12 - 4.31
Awareness (Yes)	1.126	0.393	2.865	0.004	3.08	1.42 - 6.68
Previous Experience (Yes)	1.010	0.346	2.918	0.004	2.75	1.37 - 5.53

Percentage Responses by Age group and variable

The percentage of respondents from two age groups (18-25 and 26-35) who reported "Yes" or

"No" responses across four variables: Awareness, Willingness, Previous Experience, and Current Willingness was shown in Figure 1. The chart differentiated responses by age group, showing side-by-side comparisons for each variable. For Awareness, It indicated that a higher percentage of respondents in the 26-35 age group were aware of edible insects compared to those in the 1825 age group. Conversely, the 18-25 age group showed greater percentages for Willingness to try edible insects and Previous Experience. In terms of Current Willingness, Figure 1 revealed lower percentages across both age groups, with the 26-35 group exhibiting somewhat higher current willingness compared to the younger group. These findings highlighted differences in engagement and attitudes toward edible insects between the age groups, with older individuals generally more aware and more willing to try them, while younger individuals have greater previous experience but lower current willingness.

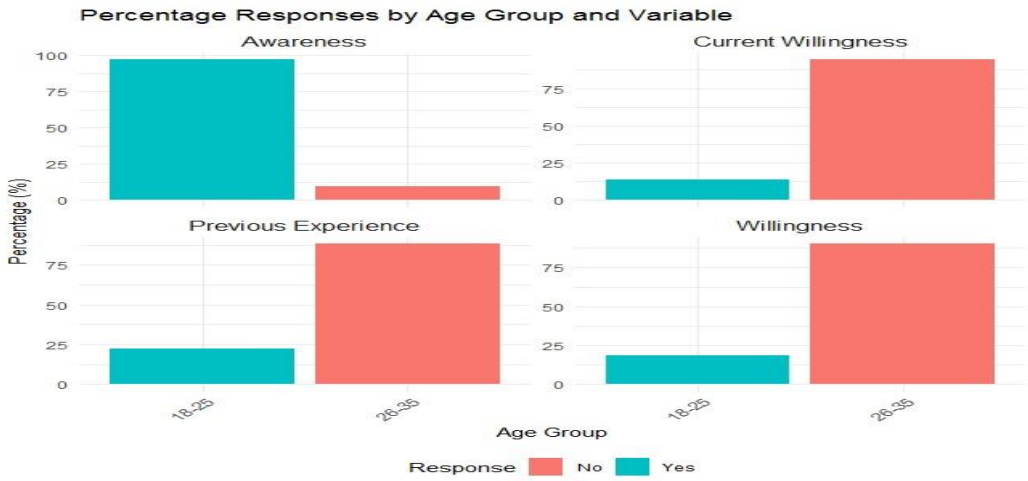


Figure 1: Percentage Responses by Age group and variable

DISCUSSION

This study investigated the resistance to edible insect consumption among youth in Ibadan, Nigeria, highlighting cultural and socioeconomic barriers. The findings revealed significant insights into the attitudes and behaviors of different age groups towards edible insects, with implications for promoting their consumption as a viable and sustainable food source. The high level of awareness about edible insects (90.3% in the 18-25 age group and 97% in the 26-35 age group) suggests that information about these insects is widely disseminated. This corroborated the result from the finding from Florença *et al.* (2023), who reported most participants from the middle aged class. This is consistent with previous studies showing that awareness does not always translate into consumption willingness (Piha *et al.*, 2018). Despite this high awareness, actual willingness to consume edible insects is notably low, particularly in the younger age group (9.7%). This discrepancy may be attributed to cultural perceptions and societal norms, which often stigmatize insect consumption as unusual or unappetizing (Deroy *et al.*, 2015). This finding aligns with the broader literature that indicates cultural factors significantly influence food acceptance (Ribeiro *et al.*, 2022).

The logistic regression analysis identified age group, awareness, and previous experience as significant predictors of willingness to consume edible insects. Specifically, individuals in the 26-35 age group are more likely to be willing to try edible insects compared to the 18-25 age group. This could be due to varying levels of exposure and openness to new food sources between these age groups. Older individuals may be more receptive to alternative food options due to a greater focus on sustainable food sources and increased environmental awareness (Dupont and Fiebelkorn, 2020). Previous studies have similarly found that age and experience are crucial factors influencing food choices (Tan *et al.*, 2015). The low current willingness to consume edible insects among those with prior experience (5.6% for 18-25 and 13.7% for 26-35) suggests that initial exposure does not necessarily lead to sustained acceptance. This phenomenon could be linked to the quality of previous experiences or inadequate promotion and education about the benefits of edible insects (Lange and Nakamura, 2021). Effective educational interventions and positive exposure experiences could be necessary to overcome these barriers.

The findings underscore the need for targeted educational and community engagement initiatives to address cultural and socioeconomic barriers. In addition to cultural factors, socioeconomic conditions play a significant role in food preferences (Baiano, 2020). The higher educational attainment among the participants suggests that education level may impact openness to novel food sources. This is in line with research indicating that higher education levels often correlate with a greater acceptance of unconventional food items (Shelomi *et al.*, 2023).

CONCLUSION

This study provides valuable insights into the resistance to edible insect consumption among youth in Ibadan, Nigeria, highlighting significant cultural and socioeconomic barriers. Despite high levels of awareness, actual willingness to consume edible insects remains low, particularly among the younger age group. The findings suggest that while educational initiatives and increased awareness are crucial, they must be coupled with strategies to address cultural stigma and improve prior experiences with edible insects. By fostering positive perceptions and integrating sustainable food practices into broader educational campaigns, it is possible to enhance acceptance and utilization of edible insects. Strategies might include integrating information about the nutritional benefits of edible insects into public health campaigns and educational programs. Moreover, engaging local leaders and influencers to normalize insect consumption could help shift cultural attitudes and reduce stigma. Such efforts could play a crucial role in advancing food security and sustainability, contributing to more resilient and diverse food systems in Nigeria and beyond.

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