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Willingness to Consume Edible Insect among the Youths in Ibadan Metropolis

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ABSTRACT

Edible insects are gaining attention as a sustainable and nutritious food source, though their acceptance remains inconsistent across demographics. This study investigated factors influencing the willingness to consume edible insects among youth in Ibadan, Nigeria, focusing on age, awareness, and previous consumption. A cross-sectional survey was conducted with 385 respondents aged 18-35 years, selected through stratified random sampling. A structured questionnaire assessed participants' awareness, willingness to consume edible insects, and previous consumption. Descriptive statistics and cross-tabulation analyses were used to examine patterns of awareness and willingness across age groups, while logistic regression analysis identified predictors of the youths' willingness to consume edible insects. The results showed high awareness levels, with 90.3% of participants in the 18-25 age group and 97% in the 26-35 age group familiar with edible insects. Despite this, willingness to consume was low, with 9.7% of the younger group and 18.6% of the older group expressing interest. Prior exposure was reported by 5.6% of the younger group and 13.7% of the older group. Willingness without prior consumption was higher, at 11.7% in the younger group and 22.1% in the older group. Logistic regression analysis revealed that age, awareness, and prior exposure were significant predictors of willingness to consume insect among the youth. Participants aged 26-35 years were 2.20 times more likely to be willing to consume edible insects than those aged 18-25 years (OR: 2.20; 95% CI: 1.12 - 4.31). Increased awareness (OR: 3.08) and prior exposure (OR: 2.75) also significantly enhanced willingness. These findings highlight the need for targeted educational initiatives to improve acceptance of edible insects and promote sustainable food practices.

Keywords: Edible insects, Youth consumption, Age factors, Awareness, Nigeria

Introduction

Edible insects have been part of human diets for centuries, celebrated for their substantial nutritional benefits and environmental sustainability (Van Huis, 2013; Bessa *et al*., 2020). As global food security becomes increasingly critical, entomophagy—the practice of consuming insects—has emerged as a viable solution to meet the nutritional demands of a growing population (Simion *et al*., 2019). Insects are a rich source of protein, fats, vitamins, and minerals, and represent a more sustainable alternative to traditional livestock farming, which is resource-intensive and environmentally damaging (Ordoñez-Araque and Egas-Montenegro, 2021).

In Nigeria, edible insects have traditionally been consumed and valued for their nutritional benefits. However, urbanization and globalization have caused shifts in dietary preferences, which may affect the acceptance of traditional foods like edible insects (Ruel*et*

al., 2017). This trend is particularly evident among the youth in urban areas such as Ibadan, a city that reflects the broader cultural and socioeconomic changes occurring across the country (Akanle*et al*., 2016). Understanding these dynamics is essential for promoting sustainable food practices and addressing the challenges of food security.

Despite the long-standing cultural significance of edible insects in Nigerian diets, acceptance varies across different demographic groups, particularly among younger populations (Ibitoye et al., 2021b). Research has shown that high levels of awareness about edible insects do not always correspond with a willingness to consume them (Orsi *et al*., 2019; Ibitoye *et al*., 2021b and Shelomi, 2023). This discrepancy between awareness and willingness highlights the need for further investigation into the factors that shape youth attitudes towards edible insects.

This study focuses on examining the influence of age, awareness, and prior exposure on the willingness to consume edible insects among youth in Ibadan, Nigeria. By exploring these factors, the research aims to identify both the barriers and facilitators affecting acceptance, offering insights into strategies that could promote entomophagy among the younger population. This approach is supported by findings from similar studies, which emphasize the critical role of cultural and experiential factors in shaping food choices (Frewer *et al*., 2003; Vermeir *et al*., 2020). Understanding how age, awareness, and prior exposure affect willingness to consume edible insects is crucial for designing effective interventions. Targeted educational programs that address specific misconceptions and barriers could significantly enhance acceptance, thereby contributing to more diverse and sustainable food systems in Nigeria (Dupont and Fiebelkorn, 2020; Ibitoye *et al*., 2021a and Lange and Nakamura, 2021).

Materials and Methods

Study Area

The study was conducted in Ibadan metropolis, the capital of Oyo State, Nigeria. Geographically, Ibadan lies between latitude 7°23'N and longitude 3°55'E, covering an approximate area of 3,080 square kilometers. It is one of Nigeria's largest and most populous urban centers, with an estimated population of about 3 million based on the most recent national census.

The research targeted three key Local Government Areas within the metropolis: Ibadan North, Ibadan South-East, and Ibadan South-West. These areas were selected for their urban nature, encompassing diverse residential, educational, and commercial zones. This diversity ensured a representative sampling of youth aged 18–35, reflecting the broader socio-cultural and demographic dynamics of the city. Ibadan is home to several higher education institutions, making it an ideal location for studying the willingness of urban youth to adopt emerging food sources such as edible insects. The centrality of the selected local government areas provided access to a socioeconomically diverse population, offering valuable insights into attitudes that may shape future food security and sustainability initiatives.

Sampling Technique

A cross-sectional study was conducted among youths aged 18–35 years residing in Ibadan metropolis. The sample size was determined using Cochran's formula for categorical data:

$$n=\frac{Z^2.p.(1-p)}{E^2}$$

Where Z=1.96 (for a 95% confidence level), p=0.5 (estimated proportion), and E=0.05 (margin of error).This calculation yielded a minimum required sample size of 384.16, which was rounded up to 385 respondents to enhance precision. Participants were randomly selected from three central Local Government Areas (Ibadan North, Ibadan South-East, and Ibadan South-West), ensuring representation of the diverse demographic and socioeconomic characteristics of urban youth in Ibadan.

Data Collection

Data were collected using a structured questionnaire designed to gather information on demographic characteristics, awareness of edible insects, willingness to consume, previous consumption, and readiness to consume edible insects again. The questionnaire included both closed-ended and Likert-scale questions to capture a wide range of responses. To enrich the analysis, findings from other regions in Nigeria and beyond were reviewed and integrated, providing a broader context for interpreting the study results.

Statistical Analysis

Data were analyzed using R version 4.3.0. Descriptive statistics were computed for demographic variables. Cross-tabulations were performed to evaluate associations between age groups and categorical variables, including awareness, willingness to try edible insects, previous consumption, and willingness to consume them. A logistic regression model was employed to identify significant predictors of willingness to consume edible insects among youth in Ibadan. The logistic regression model is expressed as:

$$Y = ß_0 + ß_1X_1 + ß_2X_2 + ß_3X_3 + \mu_i$$

Where:

Y = Willingness to consume edible insects (1 if willing, 0 otherwise)
$ß_0$= Constant
$ß_1$ =Regression coefficient for Age Group
$ß_2$ = Regression coefficient for Awareness
$ß_3$ = Regression coefficient for Previous Consumption
X_1 = Age Group (1 if 26-35 years, 0 if 18-25 years)
X_2 = Awareness (1 if aware, 0 if not aware)
X_3 = Previous Consumption (1 if previously consumed, 0 if not)
μ_i = Error term representing unobserved variability

The odds ratios (OR) and their 95% confidence intervals (CI) were calculated to interpret the effect of each predictor, and a p-value of less than 0.05 was considered statistically significant.

Results

Table 1: Demographic Characteristics of the Study Participants in Ibadan metropolis

Characteristic	Frequency (n)	Percentage (%)
Age Group		
18-25	154	40.0
26-35	231	60.0
Gender		
Male	192	49.9
Female	193	50.1

Education Level		
Secondary	120	31.2
Tertiary	265	68.8

The result of the demographic characteristics of the participants was presented in Table 1. Out of the 385 respondents, the majority were in the 26-35 age group (60%, n = 231), while 40% (n = 154) were in the 18-25 age group. The gender distribution was nearly equal, with males constituting 49.9% (n = 192) and females 50.1% (n = 193). Educational attainment was predominantly tertiary, with 68.8% holding tertiary education (n = 265), and 31.2% having secondary education (n = 120).

Table 2: Participants' Perception of Edible Insect Consumption in Ibadan metropolis

Variable	Age Group	Yes (n)	Yes (%)	No (n)	No (%)
Awareness					
18-25	154	139	90.3	15	9.7
26-35	231	224	97.0	7	3.0
Willingness (Without Previous Consumption)					
18-25	154	15	9.7	139	90.3
26-35	231	43	18.6	188	81.4
Previous Consumption					
18-25	154	18	11.7	136	88.3
26-35	231	51	22.1	180	77.9
Willingness (After previous Consumption)					
18-25	18	1	5.6	17	94.4
26-35	51	7	13.7	44	86.3

The results in Table 2 summarize the findings on the participants' perception of edible insect consumption. Awareness of edible insects was high in both age groups, with 90.3% of the 18-25 age group and 97% of the 26-35 age group reporting awareness. Despite high awareness, willingness to consume edible insects was low: only 9.7% of the 18-25 age group and 18.6% of the 26-35 age group expressed willingness (without previous consumption). Previous consumption of edible insects was reported by 11.7% of the younger group and 22.1% of the older group. The willingness to consume edible insects again (after previous consumption) was also low, with only 5.6% of the 18-25 age group and 13.7% of the 26-35 age group expressing willingness.

Table 3: Logistic Regression Analysis of Factors Influencing Participants' Willingness to Consume Edible Insects in Ibadan metropolis

Predictor	Estimate (ß)	Standard Error (SE)	z-value	p-value	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 Consumption (Yes)	1.010	0.346	2.918	0.004	2.75	1.37 - 5.53	

The result in Table 3 showed the logistic regression analysis, which examined factors influencing willingness to consume edible insects among the participants. The analysis identified age group, awareness, and previous consumption as significant predictors. Participants in the 26-35 age group had an odds ratio of 2.20 (95% CI: 1.12 - 4.31), indicating they were 2.20 times more likely to be willing to consume edible insects compared to the 18-25 age group. Awareness of edible insects had an odds ratio of 3.08 (95% CI: 1.42 - 6.68), and previous consumption of eating edible insects had an odds ratio of 2.75 (95% CI: 1.37 - 5.53), both showing significant impacts on willingness.

Participants' consumption Attitudes by Age group

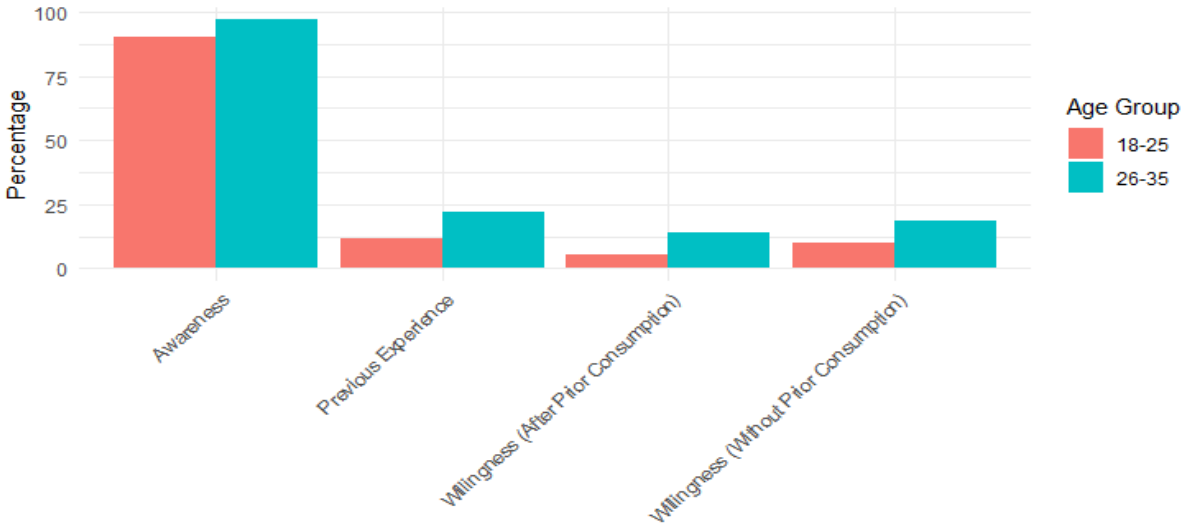


Figure1: Participants' Consumption Attitude Toward Edible Insects by Age Group in Ibadan **metropolis**

The percentage of participants from the two age groups (18-25 and 26-35) across four key variables: awareness of edible insects, willingness to consume edible insects (without previous consumption), previous consumption of edible insects, and willingness to consume edible insects (after previous consumption) was illustrated in Figure 1.The chart reveals that awareness of edible insects was notably higher among the 26-35 age group (97%) compared to the 18-25 age group (90.3%). When examining willingness to consume, the 18-25 age group showed a higher percentage of willingness

(without previous consumption) at 9.7% compared to the 18.6% in the 26-35 age group. Conversely, previous consumption of edible insects was reported more frequently by the 26-35 group (22.1%) than the 18-25 group (11.7%). Regarding willingness to consume edible insects again (after previous consumption), the 26-35 age group displayed a slightly higher percentage (13.7%) compared to the 18-25 group (5.6%).

Discussion

This study investigated the factors influencing youth attitudes towards edible insect consumption in Ibadan, Nigeria, focusing on age, awareness, and previous consumption. The findings offer valuable insights into the complex interplay between these factors and the willingness to consume edible insects. The study revealed a high level of awareness about edible insects among both age groups, with 90.3% of the 18-25 age group and 97% of the 26-35 age group reporting familiarity with edible insects. This high awareness reflects successful dissemination of information about the nutritional and environmental benefits of edible insects. However, this awareness did not translate into high willingness to consume them, highlighting a critical gap between knowledge and actual consumption behaviour.

This discrepancy is not unusual. Previous studies have demonstrated that awareness alone is often insufficient to drive behavioral change. For instance, Piha *et al*., (2018) and Ibitoye *et al.* (2021b) have noted similar gaps in other contexts, where increased awareness did not always lead to changes in food preferences. The low willingness to consume edible insects, particularly among the 18-25 age group, suggests that factors beyond knowledge, such as cultural perceptions, social norms, and personal preferences, significantly influence consumption behavior (Shine, 2020). The cultural stigma associated with insect consumption is a prominent barrier. In many societies, including Nigeria, insects are often viewed as unappealing or unconventional, which affects their acceptance as a food source (Ebenebe *et al*., 2017). This cultural resistance can overshadow the positive attitudes of edible insects, such as their nutritional benefits and sustainability (Ebenebe *et al.*, 2017). This study's findings underscore the need to address these cultural barriers through targeted interventions that challenge existing perceptions and normalize insect consumption.

The logistic regression analysis indicated that age was a significant predictor of willingness to consume edible insects. Participants in the 26-35 age group were more likely to be willing to consume insects compared to those in the 18-25 age group. This could be attributed to several factors, including greater exposure to diverse food sources, increased environmental awareness, and a more open attitude towards novel foods among older individuals (Verbeke, 2015; Dupont and Fiebelkorn, 2020). This finding aligns with the notion that as people age, they may become more receptive to alternative and sustainable food options (Verbeke, 2015). Previous consumption of edible insects was another significant factor influencing willingness. While the study found that those with previous consumption were more likely to be willing to consume insects, the overall willingness remained low. This suggests that previous consumption of edible insects does not guarantee sustained acceptance. The quality of the experience, as well as the absence of comprehensive information about the benefits of edible insects, might play a

role in shaping long-term acceptance (Lange and Nakamura, 2021).

The study's results suggest that simply increasing exposure to edible insects is not enough. Interventions should focus on enhancing the quality of these experiences and providing robust information about the nutritional and environmental benefits of edible insects. This could involve improving the culinary preparation of edible insects to make them more appealing and integrating educational components that emphasize their health benefits and environmental impact. To bridge the gap between awareness and willingness, targeted educational and community engagement strategies are essential. Public health campaigns can play a crucial role in reshaping societal attitudes by providing accurate information and countering misconceptions about edible insects (Baiano, 2020). Community-based interventions, such as cooking demonstrations and tastings, can also help normalize insect consumption and make it more acceptable (Shelomi *et al*., 2023).

Conclusion

This study underscores the complex relationship between awareness, previous consumption, and willingness to consume edible insects among urban youth in Ibadan, Nigeria. Despite high levels of awareness, particularly in the older age group, willingness to consume edible insects remains low, especially among those without previous consumption. The significant influence of age and previous consumption suggests that awareness alone is insufficient to foster acceptance of edible insect consumption. Educational programs, combined with strategic public health campaigns highlighting the nutritional and environmental benefits of edible insects, could help shift perceptions and promote greater acceptance. Such efforts could significantly enhance food security and advance sustainable dietary practices in Nigeria.

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