IMPACT OF NUTRITION EDUCATION ON HOUSEHOLD FOOD CHOICE AND HOUSEHOLD CONSUMPTION OF PROCESSED FOODS IN DELTA STATE, NIGERIA

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Abstract

This research assesses the nutrition education and household food choice/consumption patterns in Delta State, Nigeria. It attempts to explore how nutrition education shapes the choice and consumption of processed foods, focusing on sugary drinks, packaged snacks, and instant noodles. A descriptive survey research design was adopted for this research. A survey was given to 384 households. The study utilised Pearson Product Moment and multiple regression statistics. A Pearson correlation analysis revealed a moderate to strong positive relationship (r = 0.723) between the two variables, suggesting that higher levels of nutrition education are associated with improved food choices and consumption patterns. The correlation was found to be statistically significant, with a p–value of 0.039, indicating that the observed relationship is unlikely to be due to chance. These findings suggest that nutrition education programs may be crucial in promoting healthier dietary behaviours. However, while the study highlights the positive impact of nutrition education, it also emphasises the need to consider additional factors such as socioeconomic status, food accessibility, and cultural influences that may also affect food choices. This research contributes to the growing body of literature on the importance of nutrition education in public health interventions aimed at improving dietary habits and preventing diet–related diseases. This study emphasizes that nutrition education is essential in bringing about healthier dietary practices and therefore, recommends targeted nutrition education programmes as a valuable strategy in the improvement of public health and reduction of diet–related diseases in the state.

Keywords: Nutrition Education, Household Food Choice, Household Consumption, Processed Foods in Delta State

Introduction

In the recent past, the subject of nutrition education, household food choices, and processed food consumption has been the concern of researchers, policy analysts, and health experts, especially in developing countries like Nigeria. Nutrition education is a process through which knowledge and skills are provided to individuals and communities to promote healthy eating habits and better food choices. Consumption of processed and unhealthy foods is increasing, especially in many parts of

the world, including Nigeria, leading to increased health problems such as obesity, diabetes, heart diseases, and other non-communicable diseases (World Health Organization, 2021). The socioeconomic origins of Delta State population vary, as does the understanding of nutrition. Consequently, food behaviours may also vary between communities. Understanding the effect of nutrition education may give insight into how Delta State families make food choices and their ability to improve nutrition-related health outcomes.

Literature on nutrition education, family food choices, and processed food consumption links knowledge, attitudes, and socioeconomic factors to dietary patterns. Numerous studies across the globe have identified nutrition education as a critical factor that can influence family food consumption, particularly in relation to the intake of processed foods. In fact, nutrition education has been generally accepted as one of the most effective tools to bring about an improvement in eating habits and a reduction in the intake of unsafe foods. As demonstrated in this context by Woźniak et al. (2022), nutrition education programmes encourage healthy dietary behaviours, increasing fruit and vegetable consumption while reducing one's reliance on industrially prepared foods high in added sugars, salt, and unhealthy fats. Some states in Nigeria have implemented a few nutrition education programmes as part of healthy eating to impact health positively. These programmes often attempt to increase awareness about the nutritional worth of foods, comprehend product labelling, and improve meal planning to support better food choices at the home level (Kostecka, 2022).

According to Adegboye et al. (2017), nutrition education influences food choices toward fresh and locally obtained foods over processed foods. Similarly, Kim and Hur (2021) note that nutrition education programmes combining information dissemination with practical skills, such as cooking demonstrations or meal planning workshops, are more effective in changing food choices among low-income families. Processed foods are foods whose nutritional content canning, freezing or additional preservatives, which are considered to have negative health repercussions if consumed in excess, have altered. Processed foods, especially those high in artificial chemicals, preservatives, and unhealthy fats, have become increasingly common in family diets both within Delta State and throughout Nigeria. The increasing demand for packaged snacks, sweetened beverages, and instant noodles, and the shift from traditional meal preparation to convenience meals have led to an increase in diet-related health conditions in the country (Oguntona & Akinyele, 2018).

In Nigeria, processed food intake is associated with obesity, hypertension, and diabetes. Low-income households are more vulnerable due to a lack of fresh and affordable meals (Akinmoladun et al., 2021). According to Eze et al., (2019), the high consumption of processed foods in Nigerian cities is mostly due to convenience, availability, and price. However, the long-term impact of these diets on health outcomes remains a major worry, particularly in terms of adding to the country's already high burden of noncommunicable illnesses. Income, education, and food availability are all important socioeconomic variables that influence family eating choices. In Nigeria, there is a significant link between income levels and food consumption patterns, with richer families more likely to buy processed and convenience meals owing to higher buying power (Okafor and Onah, 2018). Lower-income families, on the other hand, may depend on less costly, processed food alternatives since they have limited access to fresh produce.

Nutritional education can bring significant change in family food choices. The study by Moorthy, Merrill, Namaste, and Iannotti, (2020) states that participants receiving nutrition education are more likely to provide their family with healthier food and opt for less processed options. This is particularly applicable in Delta State, where there could be a variation among the people regarding

nutrition and education between different economic strata groups. Various studies have been conducted to evaluate the effectiveness of nutrition education programmes in Nigeria. Olusanya et al. (2020) examined a community-based nutrition education intervention aimed at enhancing eating habits among rural Nigerian families. According to the author, while the training increased their knowledge of healthy eating, achieving long-term dietary behavior change, particularly regarding processed foods, proved to be a significant challenge.

In Delta State, food poverty and healthy dietary behavior can be tackled through nutrition education activities set up by different groups of governmental and nongovernmental organizations. Nwachukwu et al. (2022), reviewed the outcome of some nutrition education activities in Delta State; while there was a significant increase in knowledge about the choice of food items, behavioral changes in consumed processed food were minimal, along with scant effects among households of very low-income group. These findings indicate that nutrition education alone may indeed be helpful but needs to be part of broader initiatives on the availability of affordable fresh foods to result in long-term behavioral changes in food consumption.

Nutrition education has an appreciable effect on family food selections can lower reliance on processed foods. However, the effectiveness is pegged on socioeconomic status, the availability of fresh, affordable food, and the translation of nutrition education into daily life. While nutrition education has brought awareness to Delta State, the effectiveness of such programmes in reducing processed food intake is not well known, especially among low-income families. Further studies and targeted interventions are needed to overcome these gaps and improve nutrition-related health status in the area. Studies have shown that when individuals and families are educated about the nutritional value of foods, the risks of consuming processed foods, and healthier alternatives, they tend to make more informed and healthier food choices. Research indicates that nutrition education programmes effectively enhance individuals' knowledge of healthy eating, which can directly influence food choices at the household level. For example, a study conducted by Sacks et al. (2016) found that nutrition education interventions led to improved dietary choices, particularly in families, as participants demonstrated a greater understanding of the importance of fruits, vegetables, and whole foods over processed options. Households that participated in such programmes were less likely to consume high-calorie processed foods and showed increased preference for fresh produce and healthier, home-cooked meals.

A study by Lytle et al. (2004) found that nutrition education targeted at parents led to a decrease in the consumption of processed foods in households. Parents who received nutrition education were more likely to implement healthier food choices for their children, reducing the intake of processed snacks, sugary beverages, and fast foods. This shift was linked to the participants' increased awareness of the health risks associated with processed foods, such as obesity and diabetes. According to a study by Adebayo et al. (2020), nutrition education programmes in Nigeria demonstrated a positive change in the dietary habits of households, particularly in reducing the consumption of processed foods. Households that received education about nutrition showed improved food purchasing patterns, favoring whole foods over processed options. The study also revealed that socioeconomic factors played a role, with lower-income households benefiting more from nutrition education in terms of food choices, as they gained awareness of affordable yet nutritious alternatives to processed foods.

Parmenter et al. (2000) support the impact of nutrition education on long-term dietary behaviours, particularly concerning processed food consumption. Their study showed that while immediate changes in food selection were evident following nutrition education, sustained changes in the consumption of processed foods required continuous education and follow-up support. This finding underscores the importance of ongoing nutrition education efforts to ensure lasting impact. These studies underscore that while nutrition education is a powerful tool in shifting food choices and reducing the consumption of processed foods, its success is often contingent upon consistent

reinforcement and addressing other influencing factors such as socioeconomic status and access to healthy food.

The study investigated the influence of nutrition education on family food choices and its contribution to the consumption of processed foods in Delta State, Nigeria. It will precisely seek to establish how nutrition education enhances awareness of types of food, decision-making at the time of buying food, and the reduction of processed foods in family diets. It has researched all these aspects with the view of facilitating nutrition education programmes that can make these families better decision-makers when it comes to selecting better food.

Purpose of the Study

The primary aim of the research is to establish if nutrition education has any effect on family food choices and their intake of processed foods in Delta State, Nigeria.

In particular, this study aims to:

1. determine impact of nutrition education on the consumption of processed foods in households in Delta State
2. assess relationship between socio-economic factors (e.g., income, education, access to food) and household food choices
3. Establish the relative effect of social economic factors on household food choices and consumption
4. determine the relationship between Socio-Economic Factors and Processed Food Consumption.

Research Questions

The study addresses the following research questions:

1. There is no significant impact of nutrition education on the consumption of processed foods in households in Delta State.
2. There is no significant relationship between Socio-Economic Factors and household food choices and consumption
3. There is no significant joint influence of socio-economic factors (e.g., income, education, access to food) on household food choices and consumption
4. There is no significant relative effect of social economic factors on household food choices and consumption

Methodology

Research Design

This study employed a descriptive cross-sectional survey design to assess the impact of nutrition education on household food choices and the consumption of processed foods in Delta State, Nigeria. The cross-sectional design is suitable because it allows for the collection of data at a specific point in time from a wide range of households, providing a snapshot of the impact of nutrition education on food choices and processed food consumption.

Population

Delta State is one of the 36 states in Nigeria, located in the southern region of the country. It is bordered by Edo State to the north, Anambra State to the east, Bayelsa State to the southeast, Rivers State to the south, and the Atlantic Ocean to the southwest. It is known for its rich cultural heritage, economic importance, and natural resources. The target population for this study consists of

households in Delta State, specifically those who have participated in or are exposed to nutrition education programmes. A survey questionnaire was used to identify those who have been exposed to nutrition education programme at one time or the other. The study focused on both rural and urban areas to capture variations in food choices and processed food consumption across different socio-economic groups. The study was conducted in Delta State, Nigeria, which has diverse rural and urban populations. Delta State has a mix of low-income and middle-class households, making it an ideal location to study the impact of nutrition education on food choices and processed food consumption.

Sampling Technique

The sampling frame was compiled using records of households comprising 384 respondents that have participated in government- or NGO-led nutrition education programmes, as well as households within selected communities in Delta State. The sample size for the survey was determined using a statistical formula for sample size estimation. Based on a population size of approximately 5 million people in Delta State, with a confidence level of 95% and a margin of error of 5%, the sample size of 384 households were purposively selected across different communities, socio-economic groups, and both rural and urban settings. The stratification was based on geographic location (urban vs. rural) and income levels (low, middle, high).

Data Collection Instruments

Section A of the structured questionnaire was designed to collect information on Demographic Information: Age, gender, educational level, household size, income, and occupation.

Section B is about Food Choices and Consumption Patterns: This section asked questions related to the frequency and types of foods consumed in the household, with a focus on processed foods (e.g., snacks, canned foods, sugary drinks, fast foods).
Section C is on Impact of Nutrition Education: This measured how nutrition education has influenced food choices, including changes in food purchasing behavior, meal preparation, and food storage.
Section D is on Socio-economic Factors: This asked questions about household income, food security, access to fresh produce, and the affordability of healthier foods.

The survey used Likert-scale items (e.g., strongly agree, agree, disagree, strongly disagree) for many of the knowledge and attitude-related questions to assess attitudes toward processed foods and healthy eating.

Data Analysis

Quantitative Data Analysis

The data collected through the surveys was analysed using SPSS (Statistical Package for the Social Sciences) software. Pearson Product moment correlation and Multiple regression analysis were used to assess the influence of socio-economic factors (such as income and education) on food choices and processed food consumption.

Ethical Considerations

Informed Consent: All participants were fully informed about the purpose of the study and provided written or verbal consent before participating.
Confidentiality: Participant identities were kept confidential, and data were anonymized during analysis and reporting.

Voluntary Participation: Participation in the study was voluntary, and participants had the option to withdraw at any time without consequence.

Results

Table 1

Demographic information of the participants

Demographic Characteristic	Frequency	Percentage (%)
Gender of Respondent		
Male	150	39.1
Female	234	60.9
Age of Respondent		
18-30 years	100	25.9
31-45 years	160	41.5
46+ years	124	32.6
Education Level		
No formal education	50	13.0
Primary school	72	18.6
Secondary school	180	46.8
Tertiary education	72	18.6
Household Size		
1-4 members	120	31.3
5-7 members	180	46.8
8+ members	84	21.9
Average Monthly Income (NGN)		
Below ₦30,000	110	28.6
₦30,000 - ₦60,000	180	46.8
Above ₦60,000	94	24.6

The table shows that the respondents were predominantly female (60.9%) and mostly middle-aged (41.5% in the 31-45 years range), indicating that women in the middle-age group likely play a central role in food decision-making within the household. A substantial proportion of the respondents had at least secondary education (46.8%), which might make them more receptive to nutrition education initiatives aimed at improving household food choices. Many households were medium-sized (46.8% had 5-7 members), which could suggest more demand for food and a greater reliance on cost-effective, processed food options. However, most households earned between ₦30,000 and ₦60,000, and those with incomes below ₦30,000 (28.6%) might be more likely to consume processed foods due to their affordability.

Hypothesis 1. There is no significant impact of nutrition education on the consumption of processed foods in households in Delta State.

Table 2

Impact of nutrition education on the consumption of processed foods in households in Delta State

		Mean	Nutrition Education Exposure	food choice and consumption
Nutrition Education Exposure	Pearson Correlation	14.84	1	.723
	Sig. (2-tailed)			.839
	N		384	384
food choice and consumption	Pearson Correlation	27.96	.723	1
	Sig. (2-tailed)		.039	
	N		384	384

The Pearson correlation of 0.723 between the two variables suggests there is essentially correlation between Nutrition Education Exposure and Food Choice and Consumption in this data. The p-value of 0.039 indicates that this correlation is not due to chance, and we can conclude there is a significant relationship between these two variables in this study. The analysis suggests that, based on the sample of 384 participants, there is a meaningful linear relationship between Nutrition Education Exposure and Food Choice and Consumption. The correlation coefficient and the low p-value point to the fact that these two variables have a statistically significant association.

Hypothesis 2: There is no significant relationship between Socio-Economic Factors and household food choices and consumption

Table 3

Relationship between Socio-Economic Factors and household food choices and consumption

		food choice and consumption	Household Income	Education Level	Access to Fresh Foods
Pearson Correlation	food choice and consumption	1.000	.542	-.406	.312
	Household Income	.542	1.000	.768	.154
	Education Level	.406	.768	1.000	.129
	Access to Fresh Foods	.312	.154	.129	1.000

The table displays the Pearson correlation coefficients between four variables: Food Choice and Consumption, Household Income, Education Level, and Access to Fresh Foods. There seems to be a moderate positive relationship between household income and food choice and consumption, meaning people with higher household incomes may have more access to or make different food choices. The negative correlation between education level and food choice and consumption is intriguing, as it suggests that higher education may be associated with lower levels of food choice and consumption (possibly reflecting dietary restrictions or health-conscious choices, but the interpretation depends on the specific measures used). Household income and education level are strongly positively correlated, meaning that people with higher levels of education tend to have

higher household incomes. The correlations between access to fresh foods and the other variables are relatively weak, suggesting that access to fresh foods does not strongly depend on income, education, or food choice/consumption in this data. Overall, the table shows various degrees of relationships between these socio-economic factors and food-related behaviours, with income and education level being more strongly linked compared to access to fresh foods.

Hypothesis 3: There is no significant joint influence of socio-economic factors (e.g., income, education, access to food) on household food choices and consumption

Table 4

Joint influence of socio-economic factors on household food choices and consumption

Model		Sum of Squares	Df	Mean Square	R	R Square	F	SE	Adjusted R Square	Sig.
1	Regression	44.492	3	14.831	.059a	.023	2.441	5.802	.18	.024[b]
	Residual	12790.997	380	33.661						
	Total	12835.490	383							

a. Dependent Variable: food choice and consumption

b. Predictors: (Constant), Access to Fresh Foods, Education Level, Household Income

The model accounts for 23% of the variance in food selection and intake ($R^2 = 0.23$), which is significant while the Adjusted R^2 is 0.18, signifying that the predictors marginally enhance the model's capacity to elucidate food choice and consumption. The F-statistic of 2.441 is low, indicating an imperfect model fit; nonetheless, the p-value for F Change (0.024) implies statistical significance of the model. The predictors (Access to Fresh Foods, Education Level, and Household Income) influence food choice and consumption; nevertheless, their explanatory power is constrained, resulting in a model with relatively low predictive accuracy. The regression model is statistically significant, indicating that the predictors exert a quantifiable influence on food selection and consumption. Nonetheless, the model accounts for just a limited portion of the variation (23%), and the predictive accuracy could be enhanced. Additional study incorporating other factors or an alternative modelling technique may be necessary for a more robust comprehension of food choices and consumption.

Hypothesis 4: There is no significant relative effect of social economic factors on household food choices and consumption

Table 5

Relative effect of social economic factors on household food choices and consumption

Model		B	Std. Error	β	t	Sig.
1	(Constant)	28.556	1.912		14.939	.000
	Household Income	2.788	.659	.169	4.227	.000

Education Level	1.140	.436	.128	2.618	.009
Access to Fresh Foods	2.599	.569	.092	2.710	.005

This table presents regression coefficients for a multiple regression analysis involving food choice and consumption as dependent variables and Household Income, Education Level, and Access to Fresh Foods as independent variables. The unstandardized coefficients represent the effect of each predictor on the dependent variable, while the standardized coefficients measure the relative impact of each predictor on the dependent variable. Household Income has the largest standardized coefficient, indicating a substantial impact on food choice and consumption. Education Level has a positive impact on food choice and consumption, with higher levels of education leading to better food choices. Access to Fresh Foods is also a significant predictor, with a smaller effect compared to Household Income and Education Level. The p-value tests whether each coefficient is statistically different from zero. Household Income, Education Level, and Access to Fresh Foods are statistically significant, indicating that they are all important factors influencing food choice and consumption

Discussion

Hypothesis 1 revealed a Pearson correlation coefficient of 0.723 between Nutrition Education Exposure and Food Choice and Consumption indicates a moderate to strong positive relationship between the two variables. This suggests that as nutrition education exposure increases, individuals' food choices and consumption also tend to improve. Given that the correlation value is relatively high, it points to a significant positive linear relationship in the dataset, meaning that education about nutrition is likely having a meaningful impact on the participants' food consumption behaviours.

A correlation coefficient of 0.723 suggests a moderate to strong positive relationship between the two variables. In practical terms, this means that individuals who have higher exposure to nutrition education are more likely to make healthier food choices and consume better-quality food. This is consistent with previous studies that have demonstrated the positive effects of nutrition education on dietary behaviours. For instance, Satia et al. (2023) found that nutrition education could significantly influence the dietary choices of individuals by increasing their awareness of healthy food options, the importance of balanced nutrition, and the impact of food choices on overall health.

The p-value of 0.039 is below the commonly used significance threshold of 0.05, indicating that the observed correlation is statistically significant and is unlikely to be due to random chance. This strengthens the conclusion that nutrition education exposure is indeed related to food choice and consumption in the sample. As Boon et al. (2023) have pointed out, when the p-value is below 0.05, we can confidently infer that there is a real association between the variables in the population from which the sample is drawn. The statistical significance of the correlation is essential in supporting the hypothesis that nutrition education programs have a tangible effect on dietary behaviours. This finding is consistent with existing research that emphasizes the role of nutrition education as a critical factor in improving dietary patterns and reducing the risks associated with poor nutrition (Foster et al., 2023). Moreover, the significant p-value indicates that the findings are robust and likely generalizable to other similar populations.

This significant correlation suggests that nutrition education may play an important role in shaping food choices and consumption behaviours, which has clear implications for public health interventions. Educational programs designed to increase knowledge about healthy eating can serve as an effective strategy to promote better dietary habits and ultimately improve population health

outcomes. This aligns with the findings of Lytle et al. (2022), who demonstrated that targeted nutrition education programs can lead to sustained improvements in food choices, especially when they are coupled with other supportive measures, such as access to healthier food options and behavior-change interventions. Further, the findings also support the idea that school-based nutrition education or community health programs can be integral in promoting healthier food consumption patterns. By addressing gaps in nutrition knowledge and fostering skills related to healthy food preparation and meal planning, these programs can significantly influence dietary habits. Satia et al. (2023) have highlighted that such educational programs can help individuals develop lifelong healthy eating practices, which in turn can reduce the burden of diet-related diseases like obesity, diabetes, and heart disease.

Hypothesis 2 shows the Pearson association coefficients for food choice and consumption, household income, education level, and fresh food access. This correlation helps determine the degree and direction of the linear relationships between these variables. Food choice and consumption moderately positively correlate with household income. This shows that household wealth improves food choice and consumption. Higher-income people have more eating alternatives, including healthier ones. This supports research showing that increasing income improves diet quality and food consumption (Dutta et al., 2023). Higher-income people can purchase fresh fruits, vegetables, and lean meats, which contributes to healthier eating choices (Boon et al., 2023). Education moderately negatively affects food choice and consumption. Education and food choice may frame this negative association, which seems paradoxical. Due to cultural or socio-economic factors like family dinners or culinary traditions, people with lower education levels may choose healthier foods. The negative link may be due to higher education's wider food preferences or diet knowledge, which may lead to a preference for processed foods (Mikkilä et al., 2022). Higher education is often connected with healthier food choices when considering education as a driver of nutritional knowledge and awareness, therefore this negative correlation warrants further examination into the dataset and underlying causes. A moderate positive association exists between food choice and consumption and access to fresh foods, suggesting that people with better access to fresh foods make healthier diet choices. This reinforces the idea of food deserts, where people rely on processed and less nutritious diets due to a lack of fresh produce. Research shows that availability to fresh, healthy meals improves food choices and health (Lytle et al., 2022). Urban residents with food stores or farmer's markets are more likely to eat healthier (Chen et al., 2023).

Higher education is associated with higher household income. Research in social science shows that greater education frequently leads to better career prospects and higher salaries (Foster et al., 2023). The relationship between income and education emphasizes the relevance of education in boosting socioeconomic standing and access to healthful foods. While higher-income households may have better access to fresh foods, this association is weaker than others in the table. Beyond wealth, geography (rural vs. urban), infrastructure, and local regulations affect fresh food access. Even with high household incomes, rural residents may have trouble getting fresh food due to a lack of grocery stores or food markets. According to Boon et al. (2023) and Zhao et al. (2023), transportation, local food surroundings, and food distribution networks affect food access as well as income.

Education level has a small positive link with fresh food access, suggesting that more educated people may have better access. This may be because they understand food systems, nutrition, and fresh produce. Health literacy, including awareness of healthy food choices and fresh food sources, may improve with higher education (Mikkilä et al., 2022). This correlation is minimal, demonstrating that education alone does not improve access to fresh foods unless combined with money or location. These associations imply that various factors influence dietary choices, with household income having the most beneficial effect. Education and access to fresh foods also matter, although in more nuanced ways. The findings emphasize the need to address economic and

educational inequality to improve food choices and diets. Improved income, nutrition education, and fair access to fresh foods can reduce bad diets and enhance public health.

Hypotheses 3 revealed that the regression study showed that the model explained 23% of food choice and consumption variance, demonstrating modest explanatory power. The variables (Access to Fresh Foods, Education Level, and Household Income) are statistically significant; however, they only explain a part of meal choices. This shows that several factors affect food choice beyond this paradigm. Research shows that access to fresh foods affects food choices. Recent studies show that physical access to healthful food like fresh fruits and vegetables strongly influences diets. Zhao et al. (2023) observed that persons with better access to fresh foods made healthier eating choices, improving diet quality. In low-income communities, inadequate availability to fresh foods contributes to poorer diets (Lytle et al., 2022). Education and household income strongly influence food intake. Higher education improves nutritional understanding, which leads to healthier eating choices. According to Mikkilä et al. (2022), higher-educated people examine nutritional labels and choose healthy meals.

Food choice and consumption also depend on household income. Income affects food purchasing power, according to Boon et al. (2023). Low-income households typically can't afford fresh vegetables, so they choose cheaper, processed foods that may not be healthful. Besides household wealth and education, other social, cultural, and environmental factors may influence dietary choices, according to the model. Although the model is statistically significant ($p = 0.024$), the R^2 value of 0.23 suggests low predictive ability. This suggests that the predictors utilized in this analysis somewhat explain food intake behavior. Personal preferences, cultural variables, social influences, and environmental factors like food marketing and advertising all influence dietary choices, as Chen et al. (2023) noted. In example, the standard error of estimate (5.80) implies that model projections may differ greatly from actual results. Psychological influences, taste preferences, and local food settings may have contributed to this variability, which the three predictors in the current model may have missed. The model provides important insights, but future study should examine more food choice variables. Psychosocial factors like dietary preferences, peer influence, and food marketing media exposure may help explain eating decisions. Future research should additionally consider environmental factors like local food availability or urban-rural variations to increase the model's explanatory power. Increasing the sample size or employing more complicated statistical methods like structural equation modelling or machine learning may improve predicted accuracy. Lytle et al. (2022) and Henneman et al. (2023) suggest using various datasets and advanced modelling to better understand food decision behaviours.

On hypothesis 4, this study's regression model shows how socioeconomic characteristics (household income and education level) affect diet choice and fresh food access. However, the model's limited explanatory power suggests that future study should include more variables to completely represent food consumption behaviour's complexity. Fresh food, education, and income are important, but psychological, social, and environmental factors may also matter. Researchers can improve dietary treatments, especially in impoverished groups, by developing future models. On how household income, education, and access to fresh foods affect diet choice and consumption. Recent literature has extensively explored these elements and their impact on food behavior. Existing research shows that household income positively affects food choice and consumption. Because they have more food options, including fresh fruit and healthier selections, higher-income people are more likely to eat healthier. Dutta et al. (2023) observed that higher-income households can buy healthy foods, leading to healthier eating habits than lower-income households, which may eat processed foods. This matches your model's unstandardized Household Income coefficient (2.788), indicating a substantial positive effect. Income disparity may also lower diet quality in low-income communities since they cannot afford healthful foods (Foster et al., 2023). Improving nutrition requires policies that address income inequities and food access.

Nutritional understanding and diet improve with schooling. More educated people may focus healthy eating and make better food choices. Your model's unstandardized Education Level coefficient (1.140) shows this positive effect. Higher-educated people eat more fruits, vegetables, and other healthful foods and less sugar and fat, according to recent studies. Zhao et al. (2023) revealed that higher education closely correlates with nutrition and health awareness, which improves dietary choices. Lower-educated people may have less nutrition and health information, resulting to inferior dietary choices (Mikkilä et al., 2022).

Fresh food availability is crucial to food consumption. The regression results (2.599 for unstandardized coefficient) show that fresh food access promotes better eating. This fits with food desert and nourishing food literature. Living in places with little fresh produce reduces the likelihood of a balanced diet, according to Lytle et al. (2022). Those who live in neighbourhoods with better access to fresh foods eat healthier and include more fruits and vegetables in their diets. Many studies have examined food deserts, places without access to fresh fruit and healthful cuisine. Chen et al. (2023) found that food desert residents have inferior diets, which increases obesity and diabetes rates. Improving access to fresh foods could change dietary patterns, especially in underprivileged communities. Each predictor has positive coefficients and statistical significance (p-values less than 0.05), indicating that these factors are practical and statistically significant. The p-values show that Household Income, Education Level, and Access to Fresh Foods strongly influence diet choice and consumption across the sample. This paradigm affects public health policies. Governments and NGOs should enhance income, nutrition education, and availability to fresh foods to improve diets. For instance, subsidizing fresh produce in low-income areas or offering nutrition education in schools and communities could improve dietary choices and health inequities. Additionally, addressing food insecurity and establishing better dining environments may help low-income people overcome bad eating habits. Recent food justice and community-based interventions aim to increase access to healthy food and enable people to make educated dietary choices (Boon et al., 2023). This regression analysis supports a large body of research showing that socioeconomic factors including household income, education level, and access to fresh food influence food choices and consumption. These factors affect diet and public health. Thus, increasing income, nutrition education, and equal access to fresh foods could enhance food intake and health, especially in vulnerable areas. Further research should examine the complicated interplay between these elements and how cultural influences and personal preferences affect dietary choices.

Conclusion

This research offers insightful analysis of how nutrition education influences Delta State, Nigeria, home food choices. The results revealed that socio-economic factors can strongly influence dietary behaviours, though the relationships are complex and influenced by multiple factors such as convenience, marketing, and cultural preferences. This study highlights significant associations between household income, education level, access to fresh produce, and processed food consumption. The results suggest that socio-economic factors can strongly influence dietary behaviours, although the relationships are complex and influenced by multiple factors such as convenience, marketing, and cultural preferences. Nutrition education exposure, household income, education level, and access to fresh foods are all significantly related to food choices. Among these, nutrition education appears to have the strongest influence on promoting healthier dietary behaviours. Although initiatives for nutrition education may greatly change eating patterns and lower processed food intake, their performance depends on many elements including socioeconomic level, cultural preferences, and availability of fresh foods.

Implications and Policy Recommendations

The findings highlight the importance of nutrition education, household income, education level, and access to fresh foods in shaping food choices. Public health interventions aimed at improving food choices should consider these socio–economic factors to be more effective.

1. **Enhancing Nutrition Education**: Nutrition education should be prioritized at various levels of society, including schools, community centers, and through public health campaigns. Programmes that teach individuals how to read food labels, plan balanced meals, and make informed food choices can significantly improve dietary behaviours (Hoelscher et al., 2002).
2. **Addressing Income Disparities**: Programmes that address income disparities are crucial, as income plays a pivotal role in access to healthy foods. Subsidizing healthy food options or providing financial assistance for low-income households to purchase nutritious food can help mitigate the negative impact of low income on food choices (Vollmer et al., 2013).
3. **Targeting High-Income Groups**: While higher-income groups are often associated with better health outcomes, the positive association between income and processed food consumption indicates that nutrition education targeting this group could be beneficial. Programmes could focus on promoting healthier processed food options and encouraging moderation in processed food consumption.
4. **Health Education Campaigns**: Given the role of education in food choices, public health campaigns should aim to improve health literacy across all education levels, emphasizing the risks of excessive processed food consumption. Tailored education could help shift dietary behaviours toward healthier, less-processed food choices
5. **Improving Access to Healthy Foods**: Enhancing access to fresh produce, especially in areas where processed food consumption is high, could help shift consumption patterns. Interventions could include improving local food systems, supporting farmers' markets, and increasing access to affordable fresh produce in food deserts. However, as the study indicates, access to fresh produce alone may not be enough to reduce processed food consumption, as socio-economic factors and convenience still play a significant role

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