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EFFECT OF NUTRITION EDUCATION ON THE DIETARY HABITS OF SECONDARY SCHOOL STUDENTS IN DELTA STATE, NIGERIA

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Abstract

This quasi-experimental study examined the impact of nutrition education on dietary habits and nutrition knowledge among secondary school students in Delta State, Nigeria. Six hundred five students from 12 mixed public secondary schools in Delta Central Senatorial District participated, with students randomly assigned to an experimental group receiving nutrition education and a control group following conventional instruction. Data were collected using validated instruments: a Nutrition Knowledge Test (NKT) and a Dietary Habit Questionnaire (DHQ), administered before and after a three-month intervention consisting of weekly nutrition education sessions. Statistical analyses, including t-tests and logistic regression, assessed nutrition knowledge and changes in dietary habits. Results demonstrated significant improvements in the experimental group's nutrition knowledge across most domains, particularly in nutritional recommendations, nutrient sources, and diet–disease relationships ($p < 0.001$), except in daily food choices where no significant difference was observed. Dietary habits also improved markedly, with the experimental group scoring significantly higher (mean = 47.83) than controls (mean = 23.64). Gender analysis revealed that females benefited more from the intervention, showing significantly higher dietary habit scores than males ($p < 0.05$). Findings indicate that nutrition education substantially enhances nutrition knowledge and dietary habits among secondary school students, with gender-specific responses suggesting the need for tailored educational approaches. This study underscores the importance of integrating nutrition education into school curricula to promote healthier dietary behaviours and improve student well-being.

Keywords: Nutrition education, Nutrition knowledge, Dietary habits, Gender

Introduction

The unstable stage of adolescence is a time of rapid changes in bodily functions, thought processes, and social interactions. It is a key time in human development. This unstable time is when people start developing lifelong eating and other habits. Teenagers need enough food to grow, have good immune responses, progress in their thinking, and do well in school (World Health Organization, 2021). However, teens in Nigeria and many other developing and middle-income countries have a lot of nutritional problems, like malnutrition, not getting enough micronutrients, and a growing number of teens being overweight or obese (UNICEF, 2023). The leading causes of these problems are poverty, moving to cities, insufficient food, and insufficient schools to teach kids about nutrition (Apaokueze & Okoh, 2024).

Nutritional education is a powerful way to encourage healthy eating habits. It uses planned and scientifically backed ways to get people to adopt sustainable eating habits and make wise food choices (FAO, 2021). Teaching kids about nutrition can help them

eat less unhealthy and processed foods, learn more about food groups and nutrients, and develop positive attitudes toward healthy eating, especially in high school (Ajayi & Ekpo, 2022). Research shows that teens and young adults who know much about nutrition are likelier to choose healthier foods and stick with those habits into adulthood (Nwosu & Ijeoma, 2024).

Apaokueze and Okoh's (2025) study of how nutrition education affects the food choices and consumption of processed foods among teens in Delta State is more proof. Their research showed a strong positive link between how much nutrition education people got and how much less they ate of highly processed foods high in sugar, salt, and saturated fats. The targeted nutrition education helped students understand food labels better, made them more likely to eat traditional, healthy foods, and made choosing snacks and drinks easier. These results suggest that ongoing nutrition education may help prevent diseases that are not contagious, like type 2 diabetes, obesity, and high blood pressure. When nutrition education is interactive, relevant to the students' lives, and backed by school rules, it works better. Peer learning, food demonstrations, and school gardens are some activities that help students remember what they learned and change their behavior (Ibrahim & Yusuf, 2024). Also, working together between the health and education ministries can ensure that nutrition education is always taught and its effects are measured at all levels of the education system.

Existing research affirms nutrition education's beneficial effects on adolescents' dietary habits in Delta State, Nigeria. From improving knowledge about healthy food choices to reducing the intake of processed and low-nutrient foods, nutrition education holds the potential to shape long-term health outcomes.

Objectives of the Study

The primary objective of this study is to assess the impact of nutrition education on the dietary habits of secondary school students in Delta State. The specific objectives are:

1. To assess the existing knowledge of nutrition among Delta State secondary school students.
2. To examine the impact of Nutrition Education on dietary habits among secondary school students in Delta State
3. To determine gender differences in the impact of Nutrition Education on dietary habits among secondary school students in Delta State

Research questions

1. Would there be an improvement in students' nutrition knowledge regarding dietary habits among secondary school students in Delta State?
2. How does nutrition education impact dietary habits among secondary school students in Delta State?
3. What is the impact of Nutrition Education on dietary habits among secondary school students in Delta State based on gender differences?

Methodology

This study adopted a quasi-experimental design. It comprises one instructional group (nutrition education training) and one control/conventional group, and the dependent variable is dietary habits.

The study population comprises 19,400 home economics students in public secondary schools in the Delta Central, North, and South Senatorial Districts. These schools were selected using a simple random sampling technique. By their nature, single-sex schools were not included in the sampling process because sex is a moderator variable in this study. The students were screened, and those who scored below the threshold of 30.0 on the dietary habits scale were purposively selected. The sample size for this study comprised 605 SSI and SSII students from 12 mixed public secondary schools in the Delta Central Senatorial District in Delta State.

Data was collected using two validated instruments: a Nutrition Knowledge Test (NKT) with a reliability coefficient of 0.83 and a Dietary Habit Questionnaire (DHQ) (0.76). The NKT was used to evaluate students' knowledge of essential nutrition concepts, including food pyramids, proportions, and consequences of malnutrition. Specifically, the DHQ assessed students' dietary habits regarding food intake for pre- and post-intervention nutrition education.

The study procedure began with a pre-test in which students completed the nutrition knowledge test and dietary habit questionnaire to assess their baseline nutrition knowledge and dietary habits. Following this, the students in the experimental group participated in weekly nutrition education sessions over three months. These interactive sessions focused on teaching the importance of a balanced diet, explaining the roles of different nutrients, and guiding students on making healthier food choices. Upon completion of the intervention, the same students were given the NKT and FFQ again as a post-test to evaluate any changes in their nutrition knowledge and dietary habits resulting from the education program. Data was analysed using descriptive statistics and t-tests to compare pre-test and post-test scores and analyse the likelihood of improved dietary habits after training in the nutrition education program of secondary school students in Delta State.

Results

Would there be an improvement in students' nutrition knowledge regarding dietary habits among secondary school students in Delta State?

Table 1. Comparison of NKQ scores between participants with different Experimental and control groups

	Students Experimental group (*n* = 300)		**Students in control (*n* = 305)**		***t* Test**	
Subsection (number of items)	***M***	***SD***	***M***	***SD***	***t***	***p***
Dietary Recommendations (7)	6.50	1.33	3.62	2.06	5.707	<0.001
Source of Nutrients (38)	30.10	4.52	22.49	6.81	4.179	<0.001
Daily Food Choice (3)	2.38	0.70	2.05	0.70	−2.218	0.226
Diet–disease Relationship (20)	15.68	3.01	11.72	3.58	4.34	<0.001
Total (68)	54.66	6.87	39.88	11.16	5.874	<0.001

Table 1 presents a statistical comparison of Nutrition Knowledge Questionnaire (NKQ) scores between students in the experimental group (n = 300) and those in the control group (n = 305), covering various knowledge domains and the overall score. The findings reveal that educational intervention significantly enhanced students' nutrition knowledge in most areas, particularly in dietary recommendations, sources of nutrients, and the relationship between diet and disease. The only area without a significant difference was the daily food choice. This analysis evaluated the effectiveness of an educational intervention administered to the experimental group. In the Dietary Recommendations section (7 items), the experimental group achieved a mean score of 6.50 (SD = 1.33), significantly higher than the control group's mean of 3.62 (SD = 2.06). The t-test result ($t = 5.707$, $p < 0.001$) indicates a statistically significant improvement in students' knowledge of dietary guidelines due to the intervention. For the Source of Nutrients section (38 items), the experimental group scored an average of 30.10 (SD = 4.52), compared to 22.49 (SD = 6.81) in the control group. The difference was statistically significant ($t = 4.179$, $p < 0.001$), suggesting the intervention effectively enhanced students' ability to identify nutrient sources. In the Daily Food Choice subsection (3 items), the experimental group scored 2.38 (SD = 0.70), while the control group scored 2.05 (SD = 0.70). Although the experimental group performed slightly better, the difference was not statistically significant ($t = −2.218$, $p = 0.226$), possibly due to the small number of items or pre-existing knowledge shared by both groups. Regarding the Diet–Disease Relationship (20 items), the experimental group had a mean score of 15.68 (SD = 3.01), significantly outperforming the control group, which scored 11.72 (SD = 3.58). The t-value of 4.34 ($p < 0.001$) confirms a substantial improvement in students' understanding of the link between diet and health outcomes. The Total NKQ Score (68

items) further reinforces the effectiveness of the intervention. The experimental group recorded a mean of 54.66 (SD = 6.87), whereas the control group achieved 39.88 (SD = 11.16). This difference was highly significant ($t = 5.874$, $p < 0.001$), indicating a substantial overall impact of the educational program on students' nutrition knowledge.
How does nutrition education impact dietary habits among secondary school students in Delta State?

Table 2: Direction of difference in the impact of dietary habits among secondary school students in Delta State

Dependent Variable	Treatment	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Dietary habits	Experimental group	47.83	.462	44.74	59.271
	Control group	23.64	.400	21.63	36.215

The data presented in Table 2 shows the direction of difference in the impact of nutrition education on dietary habits among secondary school students in Delta State, comparing the experimental (treatment) group with the control group. In the experimental group—those who received nutrition education—the mean dietary habits score was 47.83, with a standard error of 0.462 and a 95% confidence interval ranging from 44.74 to 59.27. In contrast, the control group—those who did not receive the intervention—had a much lower mean score of 23.64, with a standard error of 0.400 and a confidence interval between 21.63 and 36.21. This apparent difference in mean scores indicates that students in the experimental group demonstrated significantly better dietary habits than those in the control group.

What is the impact of Nutrition Education on dietary habits among secondary school students in Delta State based on gender?

Dependent Variable	Treatment group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Dietary habits	Males	13.82	.226	11.81	19.17
	Females	21.45	.310	24.13	29.16

There is a discernible gender difference in the data on how nutrition education affects eating habits among Delta State secondary school students. In particular, the mean score for dietary habits was higher for female students who received nutrition education (21.45) than for male students (13.82). This suggests that female students exhibited more healthful eating habits after the intervention. The comparatively low standard errors for both groups—0.226 for men and 0.310 for women—indicate the reliability of the mean scores. The two groups' 95% CIs do not overlap; the ranges for males and females were

11.81 to 19.17 and 24.13 to 29.16, respectively. Following nutrition education, there was a statistically significant difference in the eating habits of male and female students, as indicated by this non-overlap. Overall, the results suggest that nutrition education benefited women more than it did men, underscoring the necessity of gender-responsive strategies in the planning and execution of school nutrition education initiatives.

Discussion of findings

The findings from Table 1 show how effective nutrition education can be at raising secondary school students' knowledge about nutrition in Delta State. According to the results on the Nutrition Knowledge Questionnaire, significant differences were observed between the experimental group that received the educational intervention and the control group that did not. These results align with growing research supporting the beneficial impacts of school-based nutrition education on teenagers' dietary understanding and choices (Nasreddine et al., 2021; Okeyo et al., 2023).

Students in the experimental group significantly outperformed those in the control group regarding dietary recommendations, indicating that the intervention successfully strengthened their awareness of national and international dietary guidelines. This finding agrees with the work of Worsley et al., who emphasized incorporating practical dietary advice into teaching materials to motivate young people to adopt healthy eating habits.

The students who participated in the intervention also learnt much about where nutrients come from. This suggests that people can better identify and group vital nutrients and the foods that contain them, which is essential for encouraging balanced eating habits. This finding aligns with recent African studies showing how crucial personalised nutrition programs are for helping teens learn about micronutrients and choose healthy foods (Akparibo et al., 2022; Adegoke et al., 2023).

The experimental group's average score on the Daily Food Choice subsection was slightly higher, with a p-value of 0.226, but this difference was not statistically significant. This might be because the subsection only has three items, which isn't enough to be sure that there are differences between the groups. People may have had a similar baseline understanding from informal sources like family traditions or news coverage. It's also possible that deeper problems, like not having enough money or being unable to get to healthy options, make it hard for knowledge alone to change behaviour.

The Diet–Disease Relationship subsection was a big exception. The experimental group did much better, with a score of 15.68 compared to 11.72, which was very significant ($p < 0.001$). This difference aligns with global health education efforts that link early nutrition awareness to a longer life. It suggests that the intervention helped people understand more clearly how diet affects the risk of chronic illness.

The most important thing was the big difference in total NKQ scores: the experimental group got 54.66 while the control group got 39.88. This difference was very significant at $p < 0.001$. This difference shows that a structured nutrition curriculum suits all teens because it gives them the basic knowledge they need to make wise food choices. Ezegbe and Onwuka (2021) stress that including holistic nutrition education in schools

and communities helps students learn new things and develop healthy eating habits that will last a lifetime.

The results corroborate that nutritional knowledge amongst participants was significantly and positively influenced by the nutrition education program across multiple domains. With these outcomes in mind, public health authorities and educational administrators should evaluate broadening evidence-based nutrition curriculum to additional secondary schools, especially those in under-resourced environments. Peer-led models and hands-on activities can strengthen future interventions to improve nutritional comprehension and cultivate behavior modifications with staying power.

The nutritional education program substantially impacted the dietary behaviours of secondary students in Delta State, as evidenced by the data in Table 2. Remarkably, the experimental group exhibited a markedly higher mean dietary habits score of 47.83 compared to just 23.64 among controls lacking structured nutrition lessons. Statistical analysis confirms this contrast is too pronounced to be coincidental, given the non-overlapping confidence intervals between the groups.

Previous research overwhelmingly shows how school-based nutritional instructions can significantly mold adolescents' food decisions and selections by supplying them with the awareness and skills to adopt healthy lifestyles (Okeyo et al., 2023; Ezegbe & Onwuka, 2021). Their findings corroborate this conclusion. Improved eating habits stem chiefly from deepened comprehension of nutritional principles alongside altered approaches to portion sizes, meal preparation, and food selection. Studies propose educational curricula that stimulate, suit various developmental levels, and gain reinforcement through consistent practice and institutional backing, yielding the most impactful results (Worsley, et al. (2020).

Additionally, the substantial difference in dietary habits scores lends credence to the theory that knowledge precedes behavioral modification in health domains. This is in line with the Theory of Planned Behavior which states that acquiring information can positively impact outlooks and perceived control over behaviours, potentially translating to healthier intentions (Ajzen, 1991). The observed progress herein likely emerged from the nutritional education, cultivating students' attitudes regarding proper nourishment and confidence in making the right dietary choices.

While the results corroborate the World Health Organization's life-course perspective on health promotion, highlighting early interventions' influence on lifelong behaviours, adolescence presents a crucial window when lifestyle habits solidify (WHO, 2024). Equipping them with sound dietary knowledge can safeguard against non-communicable diseases in later life, like obesity, type 2 diabetes, and cardiovascular disease, as prior studies found (Nasreddine et al., 2021; Singh et al., 2023).

Another essential factor is the socioenvironmental settings where students apply their learning. Interventions integrating nutrition education within structured school environments with prevalent peer influences may prove more impactful than isolated awareness drives (Akparibo et al., 2022). As one analysis outlined, curricular inclusion of nutrition education strengthens knowledge and prospects for sustainable conduct shifts, particularly when complementary elements like school meals, parental involvement, and educator reinforcement take hold.

The marked divergences in eating habits between the experimental and control groups in this investigation validate nutrition education's value in motivating adolescents toward healthier dietary selections. These results reinforce the need for such education to be incorporated into secondary school agendas by policymakers and educational stakeholders in Nigeria and comparable milieus. Future efforts should likewise employ culturally sensitive, participatory approaches to maximize impact and sustainability.

Additionally, Table 3 results demonstrate that the impact of nutrition education on dietary habits among Delta State secondary school students varies by gender. Non-overlapping confidence intervals conclusively show a statistically notable disparity, with female students attaining a considerably higher mean dietary practices score of 21.45 than the 13.82 mean score of male students. This implies that the nutrition education intervention was substantially more effective at promoting healthy eating among female students. Previous research has similarly found that women generally exhibit greater interest in nutritional and health-related information than their male counterparts, as exemplified in studies by Ezegbe and Onwuka (2021) and Okeyo et al. (2023). The findings indicate that gender-sensitive approaches must be adopted to ensure equal involvement and benefit for male students from nutrition education programs.

While nutrition education proves efficacious, socioeconomic determinants qualify its influence. Addressing socioeconomic obstacles to healthy eating should comprise a part of public health strategies. This necessitates implementing policies fostering food security and equitable access to wholesome nourishment, as broadening availability of reasonably priced fruits and vegetables, especially in low-income communities, consistent with research by Oguntona and Tella (2019).

Conclusion

This study provides empirical evidence that nutrition education can significantly improve the dietary habits of secondary school students. More so, attempts should be made to tackle socioeconomic factors that keep students from eating foods that supply nutrients to their bodies. It is possible to conclude that education for Nigerian adolescents' health and well-being is closely connected to public health policies. Thus, the study proves that the evaluability of nutrition education improves the knowledge and behaviour about what secondary school students in Delta State, Nigeria, eat. The assessed changes in adolescents' diet patterns demonstrate deterioration and improvements, where the subject is one of the most successful targets for educational interventions. The increase in fruit and vegetable intakes and the reduction in users of sugary snacks and processed foods indicate the effectiveness of educational approaches in improving adolescents' dietary habits. Yet the fact remains that from the angle of socioeconomic factors, it calls for a multi-relational approach to the two faces of education and socioeconomic determinants of healthy eating.

Recommendations

1. The Nigerian government should develop policies that mandate nutrition education in all secondary schools.
2. Educational policymakers should consider integrating comprehensive nutrition education modules into the national curriculum, ensuring that all students receive consistent and evidence-based nutrition information. Curriculum developers should collaborate with nutritionists, educators, and public health experts to design engaging and relevant content.
3. Schools should implement regular and structured nutrition education programs, incorporating interactive and practical activities such as cooking demonstrations, school gardens, and nutrition-related competitions. These activities can enhance student engagement and facilitate the application of learned concepts in real-life settings.
4. Promoting healthy eating practices outside of the school can be facilitated by involving the larger community, including parents, neighborhood health providers, and civic leaders. Healthy living and nutrition-focused community events support school-based initiatives and create a positive student environment.
5. Advocates should promote policies that address socioeconomic barriers to healthy eating, such as fruit and vegetable subsidies, restrictions on promoting unhealthy foods to teenagers, and enhancements to food environments in communities and schools.
6. To continuously evaluate the success of nutrition education programs, strong monitoring and evaluation frameworks must be put in place. Data collection on contextual factors, program fidelity, and student outcomes can help guide future developments and guarantee that interventions continue to be responsive to the needs of students.

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