

Nutrition Education Knowledge as Correlate of Nutritional Status and Practice of Adolescent in Secondary Schools in Enugu State

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Abstract

The study examined the relationship between nutrition education knowledge and nutritional status and practice of adolescent students in Secondary Schools in Enugu State. The study was guided by three specific purposes and three research questions. Correlational survey research design was adopted for the study. The population for the study consisted of 21478 Upper Basic students in Enugu State. The sample size for the study is 396 Upper Basic education students drawn using multi-stage sampling procedure. The data for the study was collected using "Nutrition Education Knowledge Questionnaire (NEKQ)" and "Nutritional Practice Questionnaire (NPQ)" developed by the researcher, and Anthropometric Measurement tools and record sheet. The NEKQ and NPQ were to face validated and tested for reliability using Cronbach Alpha reliability coefficient test, which result show an overall reliability coefficient of 0.92 and 0.84 respectively. The findings revealed that there is a positive relationship between nutrition education knowledge and nutritional status of adolescent students. There is a positive relationship between nutrition education knowledge and nutritional practice of adolescent students. There is a positive relationship among nutrition education knowledge, nutritional status and nutritional practice of adolescent students. It was recommended that teachers should strengthen nutrition education by adopting practical, learner-centered instructional approaches to enhance students' nutrition education knowledge among adolescents.

Keywords: Nutrition Education, Nutrition Knowledge, Nutritional Status, Nutritional Practice, Adolescent

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Introduction

Nutrition is a fundamental determinant of human health, growth, cognitive development, and educational achievement, particularly during adolescence when rapid physical and mental development places increased demands on nutrient intake. According to Abubakar, Shahril and Mat (2024), nutrition is the process through which the body obtains, digests, absorbs, metabolizes, and utilizes nutrients from food to support growth, maintenance of body tissues, physiological functions, and overall health. In this study, nutrition refers to the adequate intake and utilization of balanced food containing essential nutrients required to promote healthy growth, support cognitive functioning, maintain good health, and enhance the academic development of students. Adequate nutrition supplies the body with essential macronutrients and micronutrients required for energy production, tissue growth, immune function, and brain development, while poor nutrition contributes to malnutrition, weakened immunity, impaired cognition, and poor academic performance.

Globally, adolescent nutrition has become a public health priority because of the coexistence of undernutrition, micronutrient deficiencies, overweight, and obesity, collectively referred to as the double burden of malnutrition. The World Health Organization (WHO, 2023) reported that unhealthy dietary patterns established during adolescence often continue into adulthood, increasing the risk of chronic diseases and reducing productivity. Similarly, Abubakar, Shahril, and Mat (2024) observed that adolescents experience inadequate dietary diversity, excessive consumption of energy-dense foods, and significant micronutrient deficiencies that adversely affect their nutritional well-being. In this study, nutrition provides the foundation for understanding how adequate dietary intake may influence the nutritional status and dietary behaviours of adolescents students, making it an essential concept for examining the effectiveness of nutrition education in secondary schools.

Nutrition education has emerged as one of the most effective school-based strategies for promoting healthy dietary behaviours and preventing nutrition-related health problems among adolescents. It involves the systematic dissemination of scientifically accurate information, practical skills, and behavioural competencies that enable learners to make informed food choices and adopt healthy eating habits. Modern nutrition education extends beyond classroom instruction to include experiential learning, food preparation skills, meal planning, food hygiene, consumer awareness, and behaviour modification aimed at improving lifelong health outcomes. According to López-Gil et al. (2024), comprehensive school-based nutrition education programmes significantly improve adolescents' nutrition knowledge, food selection skills, and dietary practices, especially when supported by practical activities and conducive school environments. Likewise, Contento (2023) argued that effective nutrition education promotes sustainable behaviour change by helping learners understand the relationship between food choices and health outcomes rather than merely memorizing nutritional facts. Since Home Economics is the principal school subject through which nutrition education is delivered in Nigerian secondary schools, it provides an appropriate platform for developing healthy eating habits among adolescents. Consequently, nutrition education constitutes the educational intervention through which students are expected to acquire the knowledge necessary to improve both their nutritional status and nutritional practices.

Nutrition education knowledge has to do with the cognitive understanding that individuals possess regarding nutrition principles, including food groups, nutrient functions, dietary guidelines, meal planning, food safety, food preparation, and healthy eating practices. In the view of Ronto et al. (2023), nutrition education knowledge is the extent to which individuals understand fundamental nutritional principles, including nutrient functions, food groups, dietary guidelines, food safety, and healthy eating practices necessary for making informed dietary decisions. It represents the intellectual outcome of nutrition education and serves as the basis upon which informed dietary decisions are made. Studies have consistently shown that adolescents with higher nutrition knowledge demonstrate healthier eating behaviours than those with limited nutritional understanding. For instance, Ronto et al. (2023) found that nutrition knowledge significantly predicts healthier food choices, greater fruit and vegetable consumption, and reduced intake of unhealthy snacks among adolescents. Similarly, Asigbee et al. (2023) reported that adequate nutrition knowledge is associated with improved dietary diversity and healthier lifestyle behaviours among school-aged children. Nevertheless, researchers acknowledge that nutrition knowledge alone may not guarantee healthy dietary behaviour because socioeconomic conditions, parental influence, cultural practices, food accessibility, and peer pressure may either facilitate or hinder the application of acquired knowledge. In this study,

nutrition education knowledge is considered the independent variable whose relationship with nutritional status and nutritional practice among adolescent students is investigated. The study assumes that students with greater nutrition education knowledge are more likely to exhibit healthier nutritional behaviours and maintain better nutritional status than those with inadequate knowledge.

Nutritional status is an important indicator of an individual's health and nutritional well-being because it reflects the extent to which nutrient intake meets physiological requirements for growth, development, and body maintenance. According to World Health Organization (WHO) (2023), nutritional status is the physiological condition of an individual as determined by the balance between nutrient intake, nutrient utilization, and the body's nutritional requirements, commonly assessed using anthropometric, biochemical, clinical, and dietary indicators. In this study, nutritional status refers to the physical health condition of adolescent students resulting from their nutritional intake, measured using anthropometric indicators, particularly Body Mass Index (BMI), to determine whether they are underweight, normal weight, overweight, or obese. It is commonly assessed through anthropometric measurements such as Body Mass Index (BMI), weight-for-age, height-for-age, and other clinical or biochemical indicators that identify undernutrition, overweight, obesity, and micronutrient deficiencies. The nutritional status of adolescents has received increasing research attention because poor nutritional status adversely affects physical growth, cognitive functioning, school attendance, academic achievement, and future health outcomes. According to the World Health Organization (WHO) (2023), adolescent malnutrition remains a global concern despite improvements in nutrition programmes, with many countries simultaneously experiencing undernutrition and rising obesity rates. Likewise, Gabriel et al. (2024) found that adolescents continue to experience considerable levels of thinness, stunting, overweight, obesity, and micronutrient deficiencies attributable to poor dietary habits and inadequate nutrition. Since nutritional status reflects the cumulative outcome of dietary intake and nutritional behaviours, it provides an objective measure for evaluating whether nutrition education knowledge acquired by adolescent students translates into improved health outcomes and nutritional practices among adolescents.

Nutritional practice encompasses the routine dietary behaviours and food-related actions individuals perform in selecting, preparing, consuming, and managing food to maintain optimal health. According to Gabriel, Kasim, Oluma, Muka & Llanaj (2024), nutritional practice refers to the habitual dietary behaviours and food-related actions individuals exhibit in selecting, preparing, consuming, and managing food to meet their nutritional needs and maintain good health. In this study, nutritional practice refers to the everyday food-related behaviours of adolescent students, including food selection, meal frequency, breakfast consumption, fruit and vegetable intake, consumption of balanced diets, food hygiene, and adherence to healthy eating habits. Healthy nutritional practices include regular breakfast consumption, balanced meal intake, adequate consumption of fruits and vegetables, appropriate meal frequency, food hygiene, sufficient water intake, and moderation in the consumption of fats, sugar, and salt. Conversely, unhealthy nutritional practices involve meal skipping, excessive fast-food consumption, poor dietary diversity, frequent intake of sugar-sweetened beverages, and inadequate consumption of nutrient-rich foods. Studies indicate that adolescents' nutritional practices are increasingly influenced by socioeconomic conditions, peer relationships, family eating habits, social media, food marketing, and school environments. According to López-Gil et al. (2024), nutrition education interventions significantly improve healthy nutritional practices among adolescents when combined with supportive environmental and family factors. Similarly, Gabriel et al. (2024) observed that unhealthy nutritional practices remain widespread among Nigerian adolescents despite increasing awareness of healthy eating, suggesting that knowledge alone may be insufficient to influence behaviour. In this study, nutritional practice represents the observable behavioural outcome that reflects whether adolescent students apply the nutrition knowledge acquired through classroom instruction in their everyday food choices and eating habits. Consequently, examining its relationship with nutrition education knowledge will provide evidence regarding the effectiveness of school-based nutrition education in promoting healthy dietary behaviours among adolescents.

Adolescence is a critical stage of human development marked by rapid physical growth, cognitive maturation, emotional changes, and increased nutritional requirements that influence lifelong health and well-being. The World Health Organization (WHO, 2023) describes adolescence as the period between 10 and 19 years of age, during which individuals develop health behaviours that often persist into adulthood. In this study, Adolescents refer to secondary

school students aged between 10 and 19 years who are enrolled in Home Economics in secondary schools in Enugu State. They constitute the population under investigation because they are in a critical stage of growth and development where adequate nutrition education knowledge is expected to influence their nutritional status and nutritional practices. Because adolescents experience accelerated growth and greater independence in food choices, they are particularly vulnerable to both healthy and unhealthy dietary practices. Studies indicate that many adolescents, especially in low- and middle-income countries, experience poor dietary diversity, meal skipping, inadequate fruit and vegetable consumption, and increased intake of processed foods, resulting in undernutrition, overweight, and micronutrient deficiencies (Gabriel et al., 2024; UNICEF, 2023). These nutritional challenges may adversely affect physical growth, cognitive functioning, school attendance, and academic performance. Since most secondary school students fall within the adolescent age bracket, schools provide an ideal setting for nutrition education interventions that promote healthy eating behaviours. Home Economics, in particular, equips adolescents with nutrition knowledge and practical skills relating to balanced diets, meal planning, and healthy food choices. In this study, adolescents constitute the target population because they are at a developmental stage where nutrition education knowledge is expected to influence their nutritional status and nutritional practices. Therefore, investigating Home Economics students in secondary schools in Enugu State will provide evidence on whether nutrition education knowledge acquired during adolescence is associated with healthier nutritional outcomes. It is against this background that this study seeks to investigate Nutrition Education Knowledge as Correlate of Nutritional Status and Practice of Adolescent Students in Secondary Schools in Enugu State.

Statement of the Problem

Adolescence is a critical period of rapid physical growth and cognitive development during which adequate nutrition is essential for maintaining good health, supporting learning, and preventing both immediate and long-term health problems. Despite the inclusion of nutrition-related concepts in the Nigerian secondary school curriculum and increasing public awareness of healthy eating, evidence suggests that many adolescent students continue to exhibit poor nutritional status and unhealthy nutritional practices, including meal skipping, low consumption of fruits and vegetables, excessive intake of processed and sugar-sweetened foods, and other dietary behaviours that predispose them to undernutrition, overweight, obesity, and micronutrient deficiencies (World Health Organization [WHO], 2023; Gabriel et al., 2024; UNICEF, 2023). This situation raises concerns about whether the nutrition education knowledge acquired by students is sufficient to influence their nutritional status and everyday dietary practices. Although previous studies have largely focused on the prevalence of malnutrition, dietary habits, and food insecurity among adolescents, there is limited empirical evidence on the relationship between nutrition education knowledge, nutritional status, and nutritional practice among adolescent students in secondary schools, particularly in Enugu State. Consequently, it remains unclear whether students with higher nutrition education knowledge actually demonstrate better nutritional status and healthier nutritional practices than those with lower levels of knowledge. It is this gap that necessitated this study on Nutrition Education Knowledge as Correlate of Nutritional Status and Practice of Adolescent Students in Secondary Schools in Enugu State.

Objectives of the Study

The main purpose of this study was to examine the relationship between nutrition education knowledge and nutritional status and practice of adolescent students in Secondary Schools in Enugu State. Specifically, the study examined the relationship between:

1. Nutrition education knowledge and Nutritional Status of Adolescent Students in Secondary Schools in Enugu State.
2. Nutrition education knowledge and Nutritional Practice of Adolescent Students in Secondary Schools in Enugu State.
3. Nutrition education knowledge, Nutritional Status and Nutritional Practice of Adolescent Students in Secondary Schools in Enugu State.

Research Questions

The following research questions guided the study:

1. What is the relationship between nutrition education knowledge and nutritional status of adolescent students in Secondary Schools in Enugu State?
2. What is the relationship between nutrition education knowledge and nutritional practice of adolescent students in Secondary Schools in Enugu State?
3. What is the relationship between nutrition education knowledge, nutritional status and nutritional practice of adolescent students in Secondary Schools in Enugu State?

Methodology

This study adopted Correlational survey research design was adopted in this study. A correlational survey design according to Nworgu (2015), seeks to establish the magnitude and direction of the relationships between two or more variables. The adoption of this design in this study is justified because, the relationship between variables in this study is expressed in terms of correlations. This design was chosen because this study seeks to establish the relationships among nutrition education knowledge and nutritional status and practice of adolescent students. The study was carried out in Enugu State. The population of the study is 21478 Upper Basic students in six education zones of the state (Post Primary school Management board Enugu State, 2025). Upper Basic two students (JSS II) were chosen for the study because they are not in exam class. Furthermore, they are the adolescents exposed to nutrition-related instruction within the school curriculum.

The sample size for the study is 396 Upper Basic education students in Enugu State. Multistage sampling procedure was used to select JSS 2 students who took part in the study. In stage one, three out of the six education zones in the State were sampled using simple random sampling technique (lucky dip method). To achieve this, all the six education zones in the State (Agbani, Awgu, Enugu, Nsukka, Udi and Obollo Education zone) were written on a piece of paper and placed in a container. The researcher then drew three papers at random and the education zones labelled on this paper were sampled. In stage two, stratified sampling technique was used to select 6 secondary schools from each of the sampled education zones (in stage one). This sampling technique was adopted to ensure that each strata have equal chances of being represented in the study. This yielded 18 co-educational secondary schools. In the final stage, 22 Upper Basic school students were then sampled from each of the sampled schools using simple random sampling technique. This yielded a total of 396 students who took part in the study.

Three instruments were used for data collection. The first is a structured questionnaire titled "Nutrition Education Knowledge Questionnaire (NEKQ)" and the second is "Nutritional Practice Questionnaire (NPQ) developed by the researcher to measure nutrition education knowledge and nutritional practice. The questionnaire consisted of two sections: Section A should obtain respondents' demographic information, while Section B contain items measuring nutrition education knowledge and nutritional practice using. The third instrument is an Anthropometric Measurement tools and record sheet. Anthropometric Measurements tool that was used were Digital Weighing Scale for measuring the weight of the students (developed by SECA GmbH & Co. KG, Germany 2019); Stadiometer: a height Measuring Board for measuring students' height (developed by SECA GmbH & Co. KG, Germany, 2018) and a Non-Stretchable Tape for measuring students Mid-Upper Arm Circumference (MUAC). The Anthropometric Measurements measures height, weight, BMI-for-age, and MUAC, to determine nutritional status based on WHO growth standards. The anthropometric indicators adopted in this study include weight, height, Body Mass Index-for-age (BMI-for-age), and Mid-Upper Arm Circumference (MUAC). Standard WHO (2007) procedures and growth reference charts will be used. Weight was measured to the nearest 0.1 kg using a calibrated digital scale, while height was measured to the nearest 0.1 cm with a stadiometer. BMI was calculated as weight (kg) divided by height in meters squared (kg/m^2) and classified using WHO BMI-for-age z-score cutoffs. MUAC was measured with a non-stretchable tape on the left arm and recorded to the nearest 0.1 cm. These standardized procedures were adopted to ensure validity and reliability of nutritional status assessment, while recording sheets were structured by the researcher to suit the study population. the instruments we face validated and reliability tested. The Nutrition

Education Knowledge Questionnaire (NEKQ) and Nutritional Practice Questionnaire (NPQ) was analysed using Cronbach Alpha which yielded a reliability coefficient of 0.92 and 0.84 respectively.

The researcher with the assistance of trained research assistants, took necessary permissions and the questionnaires were administered directly to the respondents during school hours and retrieved immediately after completion to maximize the return rate. At the same time, students' heights and weights were measured using standardized anthropometric equipment, and the measurements recorded on the Anthropometric Measurement Record Sheet for subsequent computation of Body Mass Index (BMI). This procedure ensures accurate and complete data collection. The research questions were answered using Pearson Product Moment Correlation Coefficient (PPMC) because the study seeks to determine the relationship among continuous variables. Computed r from -1 to -0.1 implied negative relationship, computed r of 0 implied no relationship, computed r from +0.1 to +1 implied positive relationship.

RESULTS

Results are presented on Tables in line with the research questions.

Research Questions

Research Question One

What is the relationship between nutrition education knowledge and nutritional status of adolescent students in secondary schools in Enugu State?

Data collected on nutrition education knowledge of adolescent students were correlated with their nutritional status. The summary of the data analysis is presented in Table 1.

Table 1 :The Index of Relationship between Nutrition Education Knowledge and Nutritional Status of Adolescent Students

Computed r	r Square	Adjusted r Square	Standard Error of Estimate
0.684	0.468	0.466	2.31847

As seen in Table 1, the computed r was 0.684, indicating a strong positive relationship between nutrition education knowledge and nutritional status of adolescent students. The positive relationship indicates that students with higher nutrition education knowledge tend to exhibit better nutritional status. The R^2 value of 0.468 indicates that nutrition education knowledge accounts for 46.8% of the variance in the nutritional status of adolescent students. Therefore, there is a positive relationship between nutrition education knowledge and nutritional status of adolescent students.

Research Question Two

What is the relationship between nutrition education knowledge and nutritional practice of adolescent students in secondary schools in Enugu State?

Data collected on nutrition education knowledge of adolescent students were correlated with their nutritional practice. The summary of the data analysis is presented in Table 2.

Table 2: The Index of Relationship between Nutrition Education Knowledge and Nutritional Practice of Adolescent Students

Computed r	r Square	Adjusted r Square	Standard Error of Estimate	Decision
0.758	0.575	0.573	3.11268	Positive

As seen in Table 2, the computed r was 0.758, indicating a strong positive relationship between nutrition education knowledge and nutritional practice of adolescent students. The result suggests that students with higher nutrition education knowledge are more likely to demonstrate healthy nutritional practices. The R^2 value of 0.575 indicates that nutrition education knowledge explains 57.5% of the variance in nutritional practice among adolescent students. Therefore, there is a positive relationship between nutrition education knowledge and nutritional practice of adolescent students.

Research Question Three

What is the relationship between nutrition education knowledge, nutritional status and nutritional practice of adolescent students in secondary schools in Enugu State?

Data collected on nutrition education knowledge, nutritional status and nutritional practice were subjected to multiple correlation analysis. The summary of the analysis is presented in Table 3.

Table 3: Multiple Correlation among Nutrition Education Knowledge, Nutritional Status and Nutritional Practice of Adolescent Students

Computed R	R Square	Adjusted R Square	Standard Error of Estimate	Decision
0.803	0.645	0.642	2.98754	Positive

As shown in Table 3, the computed multiple correlation coefficient (R) was 0.803, indicating a strong positive relationship among nutrition education knowledge, nutritional status and nutritional practice of adolescent students. The R^2 value of 0.645 implies that 64.5% of the variation in the combined relationship among the variables is explained by nutrition education knowledge. Therefore, there is a positive relationship among nutrition education knowledge, nutritional status and nutritional practice of adolescent students.

Summary of Results

1. There is a positive relationship between nutrition education knowledge and nutritional status of adolescent students.
2. There is a positive relationship between nutrition education knowledge and nutritional practice of adolescent students.
3. There is a positive relationship among nutrition education knowledge, nutritional status and nutritional practice of adolescent students

Discussion

Nutrition Education Knowledge and Nutritional Status of Adolescent Students

The finding of this study revealed that there is a positive relationship between nutrition education knowledge and the nutritional status of adolescent students. This implies that adolescents with higher nutrition education knowledge are more likely to maintain a healthier nutritional status than those with lower levels of knowledge. The finding is consistent with the studies of Asigbee et al. (2023), who reported that improved nutrition knowledge among adolescents was significantly associated with healthier nutritional outcomes, and López-Gil et al. (2024), who found that school-based nutrition education interventions positively influenced students' dietary choices and nutritional status. However, the finding contradicts those of Spronk et al. (2022), who found that nutrition knowledge alone did not significantly predict nutritional status because socioeconomic and environmental factors had stronger influences, and Alamri et al. (2023), who observed that although adolescents possessed adequate nutrition knowledge, many still exhibited poor nutritional status due to food insecurity and unhealthy food environments. The observed agreement may be attributed to the fact that adequate nutrition knowledge enables adolescents to make healthier food choices that improve their nutritional well-being. Conversely, the disagreement may be explained by contextual factors such as poverty, household food insecurity, parental influence, and limited

access to nutritious foods, which may prevent adolescents from translating knowledge into improved nutritional status.

Nutrition Education Knowledge and Nutritional Practice of Adolescent Students

The study found a positive relationship between nutrition education knowledge and the nutritional practice of adolescent students, suggesting that increased nutrition education knowledge is associated with healthier dietary behaviours and food choices. This finding supports the studies of Ronto et al. (2023), who reported that adolescents with higher nutrition knowledge demonstrated healthier eating behaviours and greater adherence to recommended dietary guidelines, and López-Gil et al. (2024), who concluded that school-based nutrition education programmes significantly improved students' nutritional practices, including increased fruit and vegetable consumption and reduced intake of unhealthy foods. Nevertheless, the finding disagrees with Contento (2023), who argued that nutrition knowledge alone is insufficient to change dietary behaviour without supportive environmental and behavioural interventions, and Gabriel et al. (2024), who found that many Nigerian adolescents continued to engage in unhealthy nutritional practices despite having basic nutrition knowledge due to peer influence, cultural preferences, and poor food accessibility. The consistency of the present finding with previous studies may be because nutrition education equips adolescents with the knowledge and skills needed to make informed dietary decisions. In contrast, the divergent findings may reflect differences in socioeconomic conditions, food availability, family eating habits, and environmental influences that shape adolescents' nutritional practices.

Nutrition Education Knowledge, Nutritional Status and Nutritional Practice of Adolescent

The finding revealed a positive relationship among nutrition education knowledge, nutritional status, and nutritional practice of adolescent students, indicating that increased nutrition education knowledge is associated with healthier nutritional practices, which in turn correspond with improved nutritional status. This finding corroborates the studies of López-Gil et al. (2024), who established that nutrition education positively influences adolescents' dietary behaviours and overall nutritional outcomes, and Asigbee et al. (2023), who found significant associations among nutrition knowledge, healthy eating practices, and nutritional well-being among adolescents. However, the finding is inconsistent with Spronk et al. (2022), who reported that the relationship among nutrition knowledge, dietary behaviour, and nutritional outcomes was weak after controlling for socioeconomic variables, and Gabriel et al. (2024), who concluded that poor nutritional outcomes among Nigerian adolescents were largely influenced by structural factors such as poverty, food insecurity, and limited access to healthy foods rather than nutrition knowledge alone. The agreement with previous studies may be due to the role of nutrition education in improving both knowledge and healthy dietary behaviours, thereby enhancing nutritional status. The contrary findings may be attributed to contextual differences in economic conditions, cultural dietary patterns, and food environments, which can weaken the influence of nutrition education knowledge on nutritional outcomes.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Teachers should strengthen nutrition education by adopting practical, learner-centred instructional approaches to enhance students' nutrition education knowledge among adolescents.
2. School administrators should promote continuous nutrition education programmes and healthy eating campaigns within secondary schools through seminars, nutrition clubs, health talks, and awareness activities that encourage students to apply their nutrition knowledge in making healthy food choices.
3. Curriculum developers and educational policymakers should strengthen the nutrition education component of the secondary school curriculum by ensuring that nutrition concepts are comprehensive, practical, and regularly reinforced across relevant subjects. This will enable students to acquire and apply nutrition knowledge that can simultaneously improve their nutritional status and nutritional practices.

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