Nutritional Knowledge and Food Consumption of Adolescent Students in Junior High Schools in a Rural Community in the Eastern Region of Ghana

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Abstract This study examined the relationship between adolescents' nutritional knowledge and food consumption in Junior High Schools in Asiakwa in the Eastern Region of Ghana at the third term of 2017/2018 academic year. It adopted the Knowledge Attitude and Practice (KAP) Model Theory postulated by Schwartz (1976) where a descriptive survey design was used to collect quantitative data through a structured questionnaire and ten (10) objective test items all from 236 participants using the purposive and proportionate stratified random sampling techniques. With the aid of the version 22 Statistical Product for Service Solution (SPSS), descriptive (frequency, percentage, mean and standard deviation) and inferential statistics, Pearson Product Moment correlation were used to analyze the data. The study revealed that 54.9% of the adolescent students' had fair nutritional knowledge, with 40.5% having good knowledge and 4.6% having poor knowledge. It was discovered that generally, adolescent students' exhibited snacking habits as snacks and sweets were predominantly consumed (M=3.48, SD=1.59) followed by starchy roots and plantain (M=3.40, SD=1.45), cereals and grains (M=3.16, SD=1.36), animal and animal products (M=3.08, SD=1.47), fat and oil (M=2.93, SD=1.48), legumes (M=2.73, SD=1.42), with fruits and vegetables (M=2.69, SD=1.55) being the least consumed food. Besides, the study discovered that there is a small but significant positive relationship between the adolescent students nutritional knowledge and food consumption (r=0.112, p=0.074, 2-tailed). Based on these results, it was recommended that school authorities and Home Economics teachers should organize nutrition education programmes aimed at improving knowledge and awareness so as to heighten good food consumption among adolescent students' in Asiakwa.

Keywords: *nutritional knowledge, food consumption, and adolescent students*

Cite This Article: Janet Agyarkwaa Oti, and Adwoa Nyantakyiwaa Amoah, "Nutritional Knowledge and Food Consumption of Adolescent Students in Junior High Schools in a Rural Community in the Eastern Region of Ghana." *American Journal of Food and Nutrition*, vol. 7, no. 2 (2019): 36-42. doi: 10.12691/ajfn-7-2-1.

1. Introduction

Empirical evidence has established that good nutrition is the pillar around which the healthy development of individuals is anchored. Practitioners like [1] corroborate this view when they observed that optimum nutrition contributes to good health, wellbeing, normal development and high quality of life. Likewise, [2] has emphasized that nutrition is vital for healthy growth and development and has an important role to play in enhancing quality of life particularly in the prevention and management of many chronic conditions. In essence, good nutrition especially during adolescence is a must and should be accorded the highest priority as it relates to an important aspect of healthy lifestyle. [3] enumerated the benefits of good nutrition when she argued that adequate nutrition leads to optimal cardi-ovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing and psychologic-al wellbeing. Consequently, tacit health phenomenon like nutrition has caught the attention of researchers in recent years.

Scholars and practitioners have underscored the importance of nutrition as one of the fundamental core competencies of an individual. This viewpoint is grounded in the conviction that good nutrition plays a major role in the prevention of several chronic diseases, including obesity, coronary heart disease, stroke, type 2 diabetes, and certain types of cancers [4]. In furtherance of this notion, nutritional researchers such as [5,6] posit that consuming a nutrient-rich diet provides the body and mind with the energy they require and assists individuals in maintaining optimum health and wellbeing and prevention of diseases such as cardiovascular disease, cancer, and osteoporosis. From the above perspectives, one may concede that good nutrition is a predictor of healthy living and prevents the occurrence of chronic diseases thereby serving as the lifeblood that ensures the survival of a person.

The demand for an investigation on nutritional knowledge especially among adolescents has heightened recently due to concerns about the quality of food

consumed which has reached unprecedented proportions [7,8]. Practitioners such as [9,10] reported that between 17% and 35% and 7% and 45% of adolescent children in the United States of America (USA) and Gaza Strip respectively are overweight or obese. In Nigeria the prevalence of overweight and obesity among adolescent varies according to the Region and between urban and rural, as well as between private and public school students [11]. For example, [12] reported that in the Southern Nigeria, the prevalence of overweight was between 13.2% and 24.2% and the prevalence of obesity was between 1% and 2.5% whereas in the Northern Nigeria, [13] in a recent study indicated a high prevalence of underweight (29.6%) among adolescents. In Ghana, [14] put adolescents' prevalence of overweight and obesity between 4% and 7%. It is deduced from the preceding reports that unhealthy dietary practices are major contributors to the development of chronic health problems among adolescents.

Empirical research findings exist to validate the claim that good nutrition knowledge impacts good food consumption [15,16]. It could be construed that healthy lifestyle is expected to suffer if nutritional knowledge is inapposite. Consistent with these claims, the high prevalence of overweight and obesity among adolescents' could be attributed to poor and inadequate nutrition knowledge leading to poor dietary practices which results in chronic health problems. [17] recount that, in order to promote healthier eating habits among adolescents, good nutrition knowledge is very crucial. [18], therefore maintain that since the risk of many non-communicable diseases is closely related with dietary habits, various dietary education programs aimed at establishing healthy dietary habits in children is non-negotiable.

Studies on adolescent nutritional knowledge have produced inconsistent results. In their study in America and Slovenia, [19,20] revealed a poor level of adolescent's knowledge. For example [19] discovered that 76% of the adolescents had low knowledge and 24% had high knowledge and this has resulted in poor dietary practices. Assessment of nutritional knowledge and status among students from selected Secondary Schools in Sokoto Metropolis, Sokoto State, Nigeria by [21] indicated that generally, 71% of the students had poor nutritional knowledge even though the overall performance of the female students was significantly higher than their male counterparts. Other studies have established average or moderate or fair nutritional knowledge among adolescents in different areas. For example, in a survey by [22], it was discovered that adolescents had an average nutritional knowledge. [17,23,24], examined the nutritional knowledge, attitude and practices among adolescents and discovered an average, fair and moderate levels of nutritional knowledge respectively among them.

In Ghana, [25] in their study of Nutrition Knowledge, Meal Patterns, and Nutritional Status of Energy Drink Users in a Ghanaian University discovered that only 24% had good nutrition knowledge, with the rest having poor to fair nutrition knowledge. On Adolescents' Knowledge of Diet-Related Chronic Diseases and Dietary Practices in Ghana, [26] discovered that adolescents had poor nutritional knowledge. The results revealed that adolescent knowledge of diabetes, hypertension and obesity was low among the respondents with most of them (89.2%) having fair to poor knowledge of the diseases. The results above revealed that there are inconsistent results on the level of adolescent's nutritional knowledge which suggests that further investigation into this issue is necessary.

Food consumption of adolescents on the other hand has received a considerable attention since it has been identified as a critical determinant of their survival. Food consumed are characterized by the consumption of fast foods, drinking of sugar sweetened beverages, low fruits and vegetable intakes and consumption of empty calories from soda, fruit drinks and dairy desserts and are often inadequate compared to national guidelines [11,27]. Apparently, the danger of being overweight and obese in adolescence and beyond begins with what a child is fed on during childhood. In their observation, [28,29,30] noted that food consumed by children and adolescents were characterized by excess consumption of sweetened beverages and fast foods. According to [31], foods consumed by children and adolescents were mostly low in fruits and vegetables but usually ate more of starchy root and snacks. Deductively, without good nutrition knowledge and attitude in food selection especially during adolescence stage, the quest of reducing the incidence of major diseases such as cancer, oesteoporosis, high blood pressure and obesity in later life cannot be realized.

Food items consumed by adolescents range from animal and animal products, legumes, cereals and grains, starchy roots and plantain, fruits and vegetables, fats and oil and other snacks and sweets items. The [32] survey of Health Behaviour in School-aged Children (HBSC) in 35 countries and regions found that fruit and vegetable consumption was relatively low with only about 30% of the young people eating fruit every day while a similar proportion drink sugared soft drinks every day in many countries and regions [33]. Nevertheless, even though researchers have theorized a significant positive correlation between nutritional knowledge and food consumption [34,35], others [17,36] revealed no significant relationship between nutritional knowledge and food consumption which implied that poor dietary practices exist even among children with good nutrition knowledge. The results of the above studies suggest that conflicting results exist on the relationship between nutritional knowledge and food consumption. Due to the lack of agreement in the results, there is the need for further investigation on the extent to which these variables are related in specific settings.

A cursory observation and discussion with adolescent students in Asiakwa where the study was carried out revealed that most adolescents do not practice healthy eating patterns and habits; they usually skipped breakfast and preferred foods with high sugar and fat content as snacks among other dietary habits. Additionally, as schools in Asiakwa Township are not under the school feeding program offered by the government, students are very independent in their selection of food during school hours, they very often bought food from markets on school compounds outside parental guidance. What is not clear is whether these students have adequate knowledge to navigate through the complex process of food selection and consumption. With this situation, [37] cautions that

without proper research on the level of nutritional knowledge, the dietary practices of adolescents could be costly, thereby increasing the burden of non-communicable diseases in adult life. Accordingly, studies need to be conducted in specific contexts to determine the level of adolescents' nutritional knowledge and how its relationship with their food consumption as stipulated in the KAP Model Theory. It is against this backdrop that this study was carried out.

Apart from adding to the existing knowledge and literature, the findings of this study will be beneficial in a number of ways. It is hoped that the findings will help in obtaining contextual data to shed more light on the nutritional knowledge and food consumption of adolescents, thereby expand the frontiers of knowledge in the field. Besides, it will assist in determining the level of adolescent nutritional knowledge in Asiakwa. This will contribute to existing literature by exploring adolescents' perspectives on the relationship between nutritional knowledge and food consumption. Practically, the researchers hope that the findings would be significant to education stakeholders to determine how adolescents' nutritional knowledge affects their food consumption. It will enable curriculum developers to design course materials to educate adolescents on the need and relevance of adopting appropriate dietary practices to avoid chronic diseases. Finally, it is hoped that the findings of the study will provide information to teachers, school guidance coordinators, and education stakeholders on the effect of students' nutritional knowledge on their food habits so that proper nutritional education services will be offered to the students.

The research questions that guided this study were as follows:
1. What is the level of nutrition knowledge of adolescent students in Junior High Schools in Asiakwa?
2. What food(s) are mostly consumed at school by adolescent students in Junior High Schools in Asiakwa?

The study also tested the hypothesis:

H_{o1}: There is no statistically significant relationship between adolescents' nutritional knowledge and food consumption.

2. Materials and Methods

This study employed the descriptive survey design by utilizing the quantitative approach. [38] explains that the descriptive design is used to gather information about prevailing conditions or situations for the purpose of description and interpretation. It is appropriate for use when the researcher intends to make comparisons, identify trends and relationships between variables. This design was appropriate for the study which sought to investigate the relationship between nutritional knowledge and food consumption. According to [39], this design is appropriate when participants are required to self-report about particular behaviours, beliefs, attitudes, opinions, characteristics, expectations, self-classification, and knowledge. The nutritional knowledge and food consumption were based on the views of adolescent students which made this design suitable for the study. This study employed the quantitative approach where quantifiable data were generated to ascertain the relationship between nutritional knowledge and food consumption, thereby justifies the selection of the descriptive survey.

The study employed a multi-stage sampling method by combining purposive and proportionate stratified random sampling techniques. Purposive sampling is a method of sampling where the researcher deliberately chooses who to include in the study based on their ability to provide necessary data [40]. This sampling technique was used to ensure all the participants who took part in the study fell within the age bracket of adolescence. Proportionate stratified random sampling was used to put the population into strata and random selection was done so that each stratum was fairly a representative of the target population [41] and that each member of the population had an equal chance of being selected to be in the sample. At the time of the study, there were a total of six Junior High Schools (4 public/2 private) in Asiakwa totaling 472 adolescent students made up of 326 from public and 146 from private. Based on the 50% sample size recommendation of representativeness in descriptive research by [42], a sample size of 236 adolescent students were selected to participate in the study.

The target population was categorized into type of school (public and private), and the percentage of each school to the population was computed. For instance, the two private schools had a total population of 146 adolescents' students representing 31% of the population. Therefore, 31% of the sample size (236) represents 73 adolescents' students. The second stage of the selection was based on two private schools. Out of the two private schools, one had a total population of 115 students and the other had 31 students representing 79% and 21% respectively. Therefore, 79% of 73 students gave a total of 58 students and 21% of 73 students amounted to 15 students. Based on these percentages, a total of 73 students were selected from the two private Junior High Schools. The same process was followed in selecting sample from the public Junior High Schools.

The instruments for data collection included Food Consumption Questionnaire and objective test items. The Food Consumption Questionnaire (FCQ) is a weekly recall of the food consumed by adolescent students. The questionnaire was designed and pre-tested and consisted of 32 items grouped into the six major food groups categorized under animal and animal products, cereals and grains, starchy roots and plantain, fruits and vegetables, fats and oils, legumes, as well as snacks and sweets. The questionnaire was composed of two sections. Section A collected information on the demographic information of the adolescent students and Section B collected information on the variables as contained in the conceptual model and measured on a 6-point Likert scale such that (1= Never, 2= Once weekly, 3= Twice weekly, 4= Thrice weekly, 5= 4 times weekly, and 6= Daily). [43] supports the use of structured questionnaire in quantitative studies because it enhances the objectivity of data collected and supports statistical analysis. The choice of structured questionnaire was also influenced by [44] argument of its advantages such as relatively low cost,

structured information leading to straightforward analysis, quick results, as well as its stable, consistent, and uniform method of collecting data. Ten objective test items were used to collect data on the level of nutrition knowledge. Previous researchers [21,33] used test results to determine the level of nutritional knowledge of adolescents' in their studies. Even though the test was teacher-made and may lack standardization, it was used because the purpose of the study was to determine adolescent students' level of nutrition knowledge, not to compare results against a pre-determined standard.

The questionnaire and objective test item were pre-tested with 24 respondents in a Junior High School in Asikam, a nearby town which is in agreement with [45] suggestion that 10% of the sample should constitute the pilot test. Through the test-retest (with two weeks interval) approach, the Pearson coefficient of 0.86 for the questionnaire and 0.87 for the test implied the test items and the questionnaire were reliable which is in line with [46] recommendation of coefficient greater than 0.8 but less than 1. The pilot exercise proved very useful since it helped to restructure and reduce the number of items on the questionnaire and decrease the test duration by 10 minutes. More importantly, it helped to improve the quality of the questionnaire and the test for the study. After meeting the ethical requirements of anonymity, confidentiality and informed consent of conducting research, the researchers self-administered the instruments to the respondents.

2.1. Data Analysis

The returned questionnaires were screened, and those that were not responded to and poorly answered were eliminated before the actual analysis. Two hundred and thirty six (236) questionnaires and test items were distributed to the respondents, and two hundred and fifteen (215) were retrieved and used for the analysis, representing a response rate of about 91.1%. Some of the questionnaires and the test items returned were not used in the analysis because they contained many missing data whilst others too were not answered at all. Nevertheless, this response rate was considered adequate based on the suggestion of [47] that an average response rate of 30% to 40% is acceptable in surveys.

The data were coded and entered into the Version 22 of the Statistical Product for Service Solution (SPSS). The data was transformed using the SPSS compute function. Descriptive statistics such as frequencies, percentages, means and standard deviations were used to describe the data which were organized into tables. According to [48] descriptive statistics not only allows the researcher to use numbers, but also provides the researcher with data that allow for inferences on the population and directions for answering research questions. Therefore, descriptive statistics was used to describe the variables, and provided information which served as basis for the data analysis. The research questions 1-2 were analyzed using descriptive statistics (frequency counts, percentages, mean and standard deviation). In order to determine the relationship between the study variables, Pearson Product Moment correlation was employed since it is suitable for determining the bivariate correlation between two variables [49].

3. Results/Discussion

3.1. What Is the Level of Nutrition Knowledge of Adolescent Students in Junior High Schools in Asiakwa?

This research question sought to investigate the level of nutrition knowledge among the adolescents in Junior High Schools in Asiakwa. In this research question, nutritional knowledge assessment test was made up of 10 questions and administered to the respondents and scored over 10 marks. Scores between 0-4 marks indicated poor knowledge, those with scores between 5-7 marks showed fair nutritional knowledge and those with score range of 8-10 marks had good nutritional knowledge. In analyzing this research question, frequency counts and percentage were used and the result is presented in Table 1.

Table 1. Adolescents' Level of Nutrition Knowledge

Description of Nutrition Knowledge	Frequency (f)	Percentage (%)
Poor Knowledge	10	4.60
Fair Knowledge	118	54.90
Good Knowledge	87	40.50
Total	215	100.00

On the basis of the above scores in Table 1, 4.6% of the adolescent students had poor nutrition knowledge, 54.9% had fair knowledge while 40.5% had good knowledge. These results show that in general more than half (54.9%) of the adolescent students in Junior High Schools in Asiakwa had fair nutritional knowledge. This finding concurs with previous studies [17,24] who examined the nutritional knowledge, attitude and practices among adolescents and discovered an average, fair and moderate levels of nutritional knowledge respectively among adolescent students but departs from [25,26] who discovered good and poor nutrition knowledge respectively.

3.2. What Food(s) Are Mostly Consumed by Adolescent Students in Junior High Schools in Asiakwa?

This research question investigated the food(s) that were mostly consumed by the adolescent students in Asiakwa. In order to answer this research question, an exploration of the food(s) mostly consumed with respect to the six (6) major food groups as well as snacks and sweets was carried out and the results are contained in Table 2.

Table 2. Foods Consumed by Adolescent Students

Food Groups	Mean	Std. Deviation
Snacks and Sweets	3.48	1.59
Starchy Roots and Plantain	3.40	1.45
Cereals and Grains	3.16	1.36
Animal and Animal Products	3.08	1.47
Fats and Oils	2.93	1.48
Legumes	2.73	1.42
Fruits and Vegetables	2.69	1.55

The data in Table 2 indicate that generally adolescent students ate from all the six food groups as well as snacks and sweets as shown in the study. However, the results disclosed that the most dominant food that was mostly consumed by the adolescent students were snacks and sweets (M=3.48, SD=1.59) followed by starchy roots and plantain (M=3.40, SD=1.45), cereals and grains (M=3.16, SD=1.36), animal and animal products (M=3.08, SD=1.47), fat and oil (M=2.93, SD=1.48), legumes (M=2.73, SD=1.42), and fruits and vegetables (M=2.69, SD=1.55). These finding agrees with studies by [28,29,30] where it was found that food consumed by children and adolescents were characterized by excess consumption of sweetened beverages and fast foods. These results further substantiates [31], revelation that foods consumed by children and adolescents were mostly more of starchy root and snacks but low in fruits and vegetables.

3.3. Test of Hypothesis

H_{o1}: There is no statistically significant relationship between adolescents' nutritional knowledge and food consumption.

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Pearson Product Moment correlation was used to test the relationship between adolescents' nutrition knowledge and food consumption. The interpretation of the strength of correlation coefficients was based on the view of Cohen (1998) who suggests that correlation coefficient of r=0.10 to 0.29 or r=-0.10 to -0.29 is small, r=0.30 to 0.49 or r=-0.30 to -0.4.9 is medium, and r=0.50 to 1.0 or r=-0.50 to -1.0 is large. The results of the correlation matrix are shown in Table 3.

Table 3. Pearson Correlation Matrix for Nutritional Knowledge and Food Consumption

		Adolescents Nutritional Knowledge	Food Consumption
Nutritional Knowledge	Pearson Correlation	1	0.112**
	Sig. (2-tailed)		0.074
Food Consumption.	Pearson Correlation	0.112**	1
	Sig. (2-tailed)	0.074	

N=215
**Correlation is significant at p< 0.05 (2-tailed).

The Pearson correlation results in Table 3 indicate that there is a small but significant positive relationship between the adolescent students nutritional knowledge and food consumption (r=0.112, p=0.074, 2-tailed) at 0.05 alpha level. Therefore, a good nutritional knowledge engenders good food consumption while poor nutrition knowledge stifles good food consumption. Therefore, the null hypothesis that there is no statistically significant relationship between adolescents' nutritional knowledge and food consumption is rejected while the alternative hypothesis is accepted. This result is consistent with previous studies [34,35], that nutritional knowledge correlated positively with food consumption but is inconsistent with [17,36] findings where they discovered no significant relationship between nutritional knowledge and food consumption.

4. Conclusions/Recommendations

The study has revealed that nutritional knowledge of adolescent students is crucial in enhancing good food consumption. With this revelation, it is essential that school authorities through the Ghana Education Service adopt pragmatic measures and carryout nutrition education programmes that have the potential to increase adolescent students' level of nutrition knowledge to adopt healthy practices towards their food selection and consumption. Additionally, the study found that adolescent students' consumed more of snacks and sweets with the least being fruits and vegetables. To reverse this trend, it is pertinent that all education stakeholders such as parents and other non-governmental organizations support the call for nutrition education and educate children especially adolescents on the consequences of their poor dietary practices. This study concludes that good nutritional knowledge engenders good food consumption while poor nutritional knowledge stifles good food consumption.

Based on the major findings of the study, the following recommendations have been made that school authorities should design and implement nutrition education programmes such as workshops, seminars and symposia that have the potential to increase adolescents' level of nutrition knowledge. Again, Parents should either increase the allowance given to their wards for schools as it will assist students to purchase the staple foods or prepare a packed meal for their wards to take to school. Besides, Home Economics Teachers and Science Teachers should be equipped with current theories in nutrition so that they can offer necessary assistance to adolescent students on how to improve on meals they consumed. Finally, parents should be advised during parent-teacher association (PTA) meetings on the need to provide nutrient rich food and also educate their wards on the benefits and consequences of poor dietary practices. School authorities should organize orientation programmes for adolescent students' to educate them on the consequences of poor dietary practices. This would provide adolescent students' with right information and advice, which will enable them to develop, sustain and possibly enhance their understanding on the effect of not observing good dietary practices.

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