Research Article

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2021.38.006086

# Dietary Patterns as Determinant of Science Students Performance

**Hussaina HK, Annan JN and Ameyaw Y***

*Department of Biology Education, Faculty of science Education, University of Education, Winneba, Central Region, Ghana*

***Corresponding author:** Ameyaw Y, Department of Biology Education, Faculty of science Education, University of Education, Winneba, Central Region, Ghana

**ARTICLE INFO**

**Received:** July 30, 2021

**Published:** August 10, 2021

**Citation:** Hussaina HK, Annan JN, Ameyaw Y. Dietary Patterns as Determinant of Science Students Performance. Biomed J Sci & Tech Res 38(1)-2021. BJSTR. MS.ID.006086.

**Keywords:** Senior High School Science Students; Dietary Pattern; Consumption Pattern of Food; Nutrition; Academic Performance

**ABSTRACT**

The study adopted descriptive and correlational research design to investigate dietary pattern as a determinant of science students' academic performance. The study was undertaken in two schools: Odupong community day Senior High School in Awutu Senya East Municipal and Ahmadiyyah Islamic Senior High School, Gomoa Potsin all in Central Region of Ghana. The sample size was 105 science students selected from the two schools. A purposive sampling technique was used to select the schools and the participant class while random sampling was used to select students from the various classes. The instruments for data collection were questionnaire and tests (secondary data). The data collected were analyzed with SPSS software (version 25.0). Correlation and Chi-square test were used to test for relationships between dietary pattern and student academic performance in science. The results revealed that carbohydrates were the most frequent source of food (55%) consumed by students followed by proteins (21%), vegetables (14%) and fruits/minerals (10%). The students indicated that fruits and vegetables were least consumed. Among the factor that influence students dietary pattern include Taste of the food, Food nutritional value, Parents socioeconomic status, Peer influence, lack funds to buy fruits and vegetables as well as television advertisement. A statistically significant ($p= 0.049$; $< 0.05$) relationship was established between the nutritional status of students and how they perform academically. It is therefore important for parent and school authorities to ensure that students are provided with well-balanced diet.

## Introduction

Education is considered as a first step for every human activity. It plays a vital role in the development of human capital and is link with an individual's well-being and opportunities for better living [1]. It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country [1]. The quality of students' academic performance remains top priority for educators. It is meant for making a difference locally, regionally, nationally and globally. Educators, trainers, and researchers have long been interested in exploring variables contributing effectively for quality of performance of learners. More generally, the factors influencing students' academic performance can be categorized into in-school and out-school factors. The in-school factors include the qualification of teachers, availability of learning materials, class size, relevance and appropriateness of the curriculum, school leadership situation, teachers' motivation and commitment and conduciveness of school compound for the smooth running of the general teaching learning process [2]. explained that the lain drivers of students' academic performance from previous studies include the school authorities and teachers, the students, other school related factors and government policies. On infrastructure factors for instance, [3] reported that the school environment has effect on both students' and teachers' perception of science in the

classroom. While teacher-related factors were found to have a less effect on students' performance, the school level socioeconomic status has a significant effect on students' performance.

However, nutrition also indirectly influences school performance. Poor nutrition can leave students susceptible to illness or lead to headaches and stomachaches, resulting in school absenteeism. Access to nutrition that incorporates protein, carbohydrates, and glucose has been shown to improve students' cognition, concentration, and energy levels [4,5]. In contrast, nutritional deficiencies (particularly zinc, B vitamins, Omega-3 fatty acids, and protein) early in life can affect the cognitive development of school-aged children [6]. Studies also suggest that diets high in trans and saturated fats can negatively impact the brain, influencing learning and memory [6]. Furthermore, all cells in the human body including neurons and glial cells derive energy from food calories in the form of macronutrients: carbohydrates, proteins, and fats (alcohol is also a source of energy but is not considered a macronutrient because the body does not need it for survival). Before cells can gain energy from food, it must be converted into simple sugars, especially in the form of glucose, a simple sugar that is the primary source of fuel for the brain, nervous system, and red blood cells, and a preferred energy source for all other bodily cells and tissues [7]. Carbohydrates provide the most efficient source of energy for the body because they easily break down into simple sugars and are quick converted to glucose in the liver. Using either protein or fat for energy requires extra work during conversion to glucose, produces toxic by-products, and depletes the body of protein and fat needed for other bodily functions [7].

Chronic malnutrition experienced during early life inhibits growth, retards mental development, and reduces motivation and energy level, causing a reduction of educational attainments and delay in school entry [8]. This study seeks to find out whether nutrition (diet pattern) of a child is responsible for his/her academic achievement in school or not.

### Statement of Problem

Educational performance is perhaps the most imperative parameter for measuring students' well-being. It is the marker for successful college and university enrollment, scholarship awards and future job success (Ajayi, 2006). Despite all efforts made to improve students' performance academically, poor performance is still recorded in the end of terms examinations of students of the two selected senior high schools and this affect students' performance at the end of the three years secondary schooling. However, over the years, performance of students has not been very impressive from the West African Examination Council (WAEC) in the science especially in Biology. The causes of students' low performance in biology are varied. According to Shinjini and Sunita (2001), inadequate stores or intake of food nutrients can have adverse effects on children and adolescent's cognitive development. In Ghana Students' dietary pattern has received little attention as a determinant of students' academic performance although diet plays a very important role in their mental and physical development. Poor nutrition can cause illness among school children which can increase the number of students who absent themselves in school. It can also retard the students' cognitive development and retards their growth.

Savige, Ball, Worsley and Crawford (2007) asserted that lack of important nutrients in adolescent diet poses a greater risk of nutritional deficiencies which can even affect their classroom performance. Additionally, the adolescence life stage is a period of increasing independence with respect to food choices and food habits and experimentation with diets which may increase vulnerability to nutritional problems if unhealthy eating behaviors are adopted. This study therefore investigates dietary pattern as a determinant of science students' performance in two selected Senior High Schools.

The following research questions answered the study:

**a)** What is the food consumption patterns that are followed by science students?

**b)** What factors influence the choice of food consumption patterns of science students?

**c)** To what extent do food consumption patterns (nutrition) affect science students' academic performance?

### Hypotheses of the Study

**Null Hypotheses (Ho):** Academic performance of students has no association with the nutritional profile of the students.

**Alternative Hypotheses (H1):** Academic performance of students has association with the nutritional profile of the student.

## Methodology

### Study Area

The study was undertaken in two schools: Odupong Senior High School in Awutu Senya East Municipal and Ahmadiyyah Islamic Senior High School, Gomoa Potsin all in the Central Region of Ghana.

### Research Design

The study adopted descriptive and correlation research designs. Firstly, the research considered how the predicted variable, nutrition (diet pattern) influence and mediate students' academic performance. Secondly, factors that influence the choice of food consumption patterns of students were identified. In addition, the relationship between nutrition (diet pattern) and academic performance of the students were also considered in the study.

### Sampling Technique

Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population [9]. defined sampling as a process of selecting some individuals from a larger group in order to form the basis for estimating or predicting the existence and extent of unknown information or outcome on the bigger population. Sampling is a trade-off between some benefits and disadvantages although it saves costs and time, the information on the population is not known but only through an estimate [9]. Sampling techniques, on the other hand, are the strategies applied by researcher during the sampling procedure. In this research, two-stage sampling procedure was adopted. In the first stage, purposive sampling was used to select the schools and participant class in the schools. Purposive sampling is a non-probability sampling procedure where the researcher selects a target sample based on pre-determined set of reasons. This includes personal experience, availability of information, among others. In the second stage, simple random sampling was employed to select the respondents from the class. Unlike purposive sampling, simple random sampling is a probability sampling procedure that allows equal and known probabilities of inclusion of every individual in the sample unit. It is widely used in selecting samples through probability methods [9].

### Data Collection Instruments

**a.** Academic achievement scores obtained in Elective Science subjects in the school end of terms examination.

**b.** Questionnaire given to students to respond about their personal diet or nutritional choices.

**c.** Unstructured interview was be used to solicit for information that were not captured by the questionnaire

### Data Collection Procedures

The study relied on primary data collected from students who were offering general sciences, and secondary data was based on the students' scores.

### Questionnaires on Nutrition (Dietary Pattern Intake)

Questionnaire was chosen because it is effective in securing information from the respondents within the shortest possible time. The questionnaire was done using Likert scale format. The options include Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The respondents were to tick appropriate option that applied to them on factors that influence their nutritional pattern. Again, the questionnaire on food was to obtain data on the types of food eaten by the students. Each of the respondents was asked to give the choice and frequencies at which he/she consumes on the listed food recorded on an individual dietary score sheet. High, moderate, and low was used with the following scale 1-3 indicate one (1), 4-7 indicate two (2) and 8-10 indicate (3) respectively to determine the weight for appropriate intake of food. Also, students responded to the questions that provided information on factors that affect their dietary or nutritional intake.

### Document Analysis

The researcher took a secondary data on academic performance test scores of the students from first year: terms one, two and three; and second year term one. The scores were added for the four terms, divided by the total of the scores, multiplied by hundred (100) and came out with each student's score which was compared with each student's nutritional status (diet pattern) within the period of study to establish whether there was a difference between them.

### Data Analysis

The data collected were analyzed with SPSS software (version 25.0). Descriptive statistics such as mean, standard deviation as well as simple percentages were used for analysis of questionnaire output. The researchers used cross-tabulation, Chi-Square ($\chi 2$) and one way ANOVA test to determine the relationship and statistical significance of variables.

### Ethical Consideration

Ethical issues were taken into consideration in this study. In the first place, consent was sought from the schools to find out their willingness to participate in the study or not. The researchers ensured that names and personal details of the respondents were not revealed or published. The data collected was kept confidential and used only for research purposes.

## Results and Discussion

The results and discussion are presented in accordance with the research questions posed. Table 1 shows that out of the 105 respondents selected for the study 67.9% and 32.4% of them were males and females respectively. Among the respondents, 39% were aged between 14- 16, 59% were aged between 17-19 and 1.9 % aged between 20-22 years. The total number of students selected from the two senior high schools was 105. Out of this number, 34.3% and 65.7% were selected from Odupong Community Day SHS and T.I Ahmediyyah Islamic SHS respectively.

### Research Question 1: What Food Consumption Patterns are followed by Science Students?

Table 2 and Table 3 show that the foods consumed by the students were grouped into cereals, legumes, fruits, vegetable,

root and tubers, animal product and snacks. The researcher has classified the aforementioned foods as carbohydrates, protein, fruits/vitamins and mineral salts. The most commonly consumed carbohydrates were maize (22.9%) eaten five times a week, rice (28.8%) eaten seven times a week and yam (24.6%) and cassava (24.8%) were eaten twice and once a week respectively. Protein: beans (29.5%), eggs (24.8%), groundnut (23.4%) and fish (21.9%) were consumed twice in a weeek. While among the consumption rates of fruits/vitamins/mineral salts are banana (21.9%), orange (24.8%), mango (22.9%) and green leave vegetable (19.0%) and okra (27.6%) consumed once, thrice and fourth respectively (Appendix B). Again, in Tables 4 and 4.3, the consumed foods were: Carbohydrate 55%, proteins (21%), vegetables (14%) and fruits/minerals (10%).

**Table 1:** Demography of Respondents.

| S/n | Item | Frequency | Percentage (%) |
|---|---|---|---|
| 1. | **Gender** | | |
| | Male | 71 | 67.9 |
| | Female | 34 | 32.4 |
| 2 | **Age (Years)** | | |
| | 14- 16 | 41 | 39 |
| | 17-19 | 62 | 59 |
| | 20-22 | 2 | 1.9 |
| 3. | **Name of Schools** | | |
| | Odupong Community Day SHS | 36 | 34.3 |
| | T.I. Ahmediyyah Islamic SHS | 69 | 65.7 |

Source: Fieldwork Data, (2018).

**Table 2:** Frequency intake of carbohydrates by the participants (N=105).

| Choice of Diet | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Maize | 5 | 18 | 19 | 14 | 24 | 7 | 17 | 0 | 1 | |
| Rice | 3 | 11 | 16 | 23 | 16 | 6 | 30 | 0 | 0 | |
| Wheat | 22 | 8 | 1 | 3 | 2 | 1 | 4 | 16 | 48 | |
| Yam | 26 | 24 | 12 | 6 | 2 | 0 | 1 | 34 | 0 | |
| Cassava | 26 | 17 | 12 | 10 | 4 | 1 | 9 | 26 | 0 | |
| Sweet potato | 22 | 12 | 9 | 1 | 1 | 0 | 2 | 24 | 4 | 30 |

Source: Fieldwork Data, (2018).

**Table 3:** Frequency intake of proteins by the participants (N=105).

| Choice of Diet | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 |
|---|---|---|---|---|---|---|---|---|---|
| Beans | 18 | 31 | 29 | 13 | 4 | 4 | 5 | 11 | 0 |
| Groundnut | 25 | 20 | 15 | 9 | 9 | 2 | 1 | 16 | 0 |
| Cowpea | 12 | 6 | 2 | 1 | 1 | 1 | 0 | 0 | 82 |
| Fish | 10 | 8 | 10 | 23 | 19 | 12 | 23 | 0 | 0 |
| Meat | 13 | 28 | 11 | 9 | 7 | 11 | 14 | 0 | 12 |
| Eggs | 26 | 19 | 14 | 11 | 4 | 5 | 3 | 16 | 7 |
| Milk | 22 | 21 | 20 | 11 | 4 | 3 | 9 | 15 | 0 |

Source: Fieldwork Data, (2018).

A1 = Once in a week

A2 = Twice in a week

A3 = Thrice in a week

A4 = Four times in a week

A5 = Five times in a week

A6=Six times in a week

A7 = Seven times in a week

A8 = monthly

A9 = Never

A10 = Fort night

**Table 4:** Factors that affect students' food or dietary pattern.

| s/n | Item A | | D | Mean | SD |
|---|---|---|---|---|---|
| 1 | The taste of the food affects my food pattern. | 91(86.7%) * | 14(13.3) * | 3.8 | 0.04 |
| 2 | I do not eat certain food because of food taboos in my village. | 23(21.9%) * | 82(78.1%) * | 1.4 | 1.12 |
| 3 | Because of my bad experience with certain foods, I do not eat them. | 45(42.9%) * | 60(57.1%) * | 2.2 | 0.01 |
| 4 | I buy or eat food because of its nutritional value. | 75(71.4%) * | 30(28.6%) * | 3.1 | 0.75 |
| 5 | My church doctrine prevents me from eating certain food. | 18(17.1%) * | 87(82.9%) * | 1.2 | 0.45 |
| 6 | The food we consume in the house depends on my parents' socioeconomic status. | 98(93.3%) * | 7(6.7%) * | 3.4 | 0.02 |
| 7 | I have abstained from certain foods because of my health conditions. | 37(35.2%) * | 68(64.8%) * | 1.9 | 0.5 |
| 8 | I am influenced by friends on the choice of food I eat in school. | 82(78.1%) * | 23(21.9%) * | 3 | 0.95 |
| 9 | The food I consume in school depends on the menu used by the kitchen only. | 79(75.2%) * | 26(24.8%) * | 2.8 | 1.21 |
| 10 | I lack funds to buy fruits and vegetables. | 92(87.6%) * | 13(12.4%) * | 3.2 | 1.8 |
| 11 | Food advertisements on television affect my food choice. | 101(96.2%) * | 4(3.8%) * | 3.6 | 0.82 |
| 12 | Students do not eat heavy foods during examination periods. | 61(58.1%) | 44(41.9%) | 2.7 | 1.65 |

Percentages in parenthesis*

## Discussion

Carbohydrates were the most frequent source of food consumed by the students, followed by proteins and fruits/vitamins/mineral salts. Consuming sufficient amount of carbohydrates was suitable for the students' academic work. All parts of the body including the brain need energy to function well. Students may feel weak and lazy to learn or carry out their daily activities if the energy they have is not sufficient. The human brain also needs energy to function properly. In fact, the brain accounts for only about 2% of a person's body weight but consumes between 20-30% of the body's available energy and oxygen [10]. He attributed it to the fact that active neurons burn fuel to function. In fact, carbohydrates provide the most efficient source of energy for the body because they easily break down into simple sugars and are quickly converted to glucose in the liver. Glucose, a simple sugar, is the primary source of fuel for the brain, nervous system, and red blood cells, and a preferred energy source for all other bodily cells and tissues [11]. This food pattern suggests that the respondents took in a lot of carbohydrate giving food. World Health Organization (WHO) recommends that 55-75% of humans' calories should come from carbohydrate.

The students' meals include proteins from plant and animal sources. Beans are the highest source of protein in the respondents' diet. This is followed by egg consumptions. Proteins are found in foods such as meat, fish, milk, and cheese. According to [12], proteins are used to make most of the body's tissues, including neurotransmitters, earlier identified as chemical messengers that carry information from brain cells to other brain cells. A lack of protein, also known as Protein Energy Malnutrition, lead to poor school performance by children and caused young children to be lethargic, withdrawn, and passive, all of which help affect social and emotional development. Inclusion of eggs to students' meal is very helpful since it provides the body with Omega -3 fatty acids. Omega-3 fatty acids are very important to the optimum performance of the brain and a lack of these fats can lead to depression, poor memory, low IQ, learning disabilities, dyslexia, and ADD [12]. In a follow-up interview, some of the students mentioned that they are not given enough proteins and that affect their cognitive development. Fruits and vegetable consumption provides the body with important vitamins and mineral salts suitable to improve body building and functioning of the brain. Vitamins and minerals are important substances for the functioning of the brain. Most important are the vitamins A, C, E, and B complex vitamins. Manganese and magnesium are two minerals essential for brain functioning; sodium, potassium and calcium play a role in message transmission and the thinking process.

In a follow-up interview with some of the respondents, it was revealed that vegetable and fruit consumption was very minimal. This means that most of the students' body systems might lack

some important food nutrients that could have improved their cognitive development. Also, fruits and vegetables provide the body with nutrients that protect the body against infection and diseases. Absence of these nutrients means that students may fall sick easily and might absent themselves from school which can impact on their learning and academic performance. In a similar study, [13] asserted that nutrition affects learning and behavior and suggested that diet can influence cognition and behavior in many ways, which include the condition of not enough nutrition or the condition of the lack of certain nutrients.

### Research Question 2: What Factors Influence the Choice of Food Consumption Patterns of Science Students?

In Table 5, the respondents 86.7% scored a mean of 3.8 (SD=0.04) to agree that the taste of the food affect their food habit. The small standard deviation suggests that the respondents were consistent in their decision. Majority of the respondents 78.1% and 57.1% scored means of 1.4 (SD =1.12) and 2.2 (SD=1.5) to disagree that taboos in their village and their bad experiences with certain food do not influence their dietary pattern respectively. The high standard deviation obtained for the two mean scores indicates that some of the students were not sure about their response and so were not consistent in their decision. The respondents, 71.4% and 93.3% scored means of 3.1(SD=0.75) and 3.4(SD=0.02) to agree that they buy or eat food because of its nutritional value and that food consumed in their homes depends on their parents' socioeconomic status respectively. The small standard deviations obtained for students' responses indicate that most of the students agree to this and were consistent with their response. A higher number 82.9% scored a mean of 1.2 (SD = 0.45) to disagree that their church doctrines prevent them from eating certain foods. The small standard deviation suggests that most of the students are consistent with their decision. Also, only few of the respondents 35.2% agreed that they abstain from certain food because of health conditions.

**Table 5:** Summary of students' academic results and nutritional status.

| Item | N | Mean | SD | Mode | Min | Max |
|---|---|---|---|---|---|---|
| Scores | 150 | 58.38 | 8.5 | 56.83 | 28.4 | 79.67 |
| Nutrition scale | 150 | 4.57 | 1.08 | 4.11 | 2.7 | 7.48 |

Source: fieldwork Data, (2018).

The results shows that 78.1% of the respondents scored a mean of 3.0 (SD=0.95) to agree that their friends influence them on the choice of food they eat. Some of the respondents 75.2%, 87.6% and 96.2% scored means of 2.8 (SD=1.21), 3.2(SD=1.8) and 3.6(SD=0.82) to agree that food they consume in school depends on the menu used by the school kitchen only, they lack funds to buy fruits and vegetables in school and their food choice is influenced by television advertisement respectively. Also, 58.1% of the respondents agreed (mean=2.7; SD=1.65) that they do not eat heavy food during examination periods. The high standard deviation indicates that most of the students were not consistent in their decision.

## Discussion

The taste of food affects the dietary pattern of most students while taboos available in students' village only influence students' dietary pattern to a smaller extend. In a similar study, Fismen et al. [14]. stated that preference for tastes and family eating were some of the influential factors of dietary intake. This suggests that food prepared for adolescents and teenagers in schools and in the house should taste well. Also, less than 50% of the respondents indicated that their previous bad experience with certain food has prevented them from eating such food. In a follow-up interview, some of the students mentioned that when they eat beans that are not well cooked, they usually have gas in their stomach, and have stopped eating beans although it is one of the proteins giving food that helps to improve the functioning of the brain and other important body cells. Again, it was revealed that, most of the students buy or eat food because of its nutritional value. This indicates that the knowledge students have on food nutritional value affected their dietary intake. This finding agrees with that reported by Kabir, Miah and Islam [15]. They opined in their studies that students had poor nutritional knowledge which resulted in them consuming more fat-like substances. This suggests that when students become much aware of the nutritional value of the food they are taking, it will help them to make the right decision on their diet.

Furthermore, only few of the respondents indicated that their church or religious doctrines prevented from taking certain food. Another factor that affects students' food consumption is their parent socioeconomic factor. Some of them agreed that due to poor socioeconomic status of their parents, they lack the funds to buy fruits and vegetables and so eat less quantity of these foods. In a similar study, students of low socioeconomic status often engaged in unhealthy dietary habits and had poor nutritional intake [16]. Also, study conducted in other settings presents similar views that socioeconomic capacity is associated with food habits; for example, adolescents in schools in Nordic countries are more likely to consume fruits and vegetables daily [17]. However, adequate nutrition is fundamental at this age in order to maintain good

physical and mental health, ensure healthy cognitive and intellectual development, and achieve optimum academic performance [18]. In this study health conditions affect food intake of few students while peer influence affect the food intake of majority of the students. In a follow up interview some of the students mentioned that they are often influence by their friends to buy or eat certain food. They added that sometimes once their friends have recommended the food, they do not consider the nutritional benefit of the food. They also, mentioned that advertisement made on food influence the dietary pattern on food especially in the house. Most of the respondents mentioned in a follow up interview mentioned that they prefer to take indomie because they often advertise them on television.

This suggests that nutritionists can influence the dietary impact of students and many adults through this media to improve the health of students and the public at large. It was also revealed that majority of the students depends on the food prepared by the school kitchen. It is therefore important for school authorities to include in their menu food that can improve students' cognitive development. Similarly, [19] reported on eight key factors that influence food consumption pattern of children and adolescents. These factors included food preferences, perceptions of healthy eating, family environment, peer influence, school influence, food advertising, lifestyle characteristics and control and choice.

### Research Question 3: To What Extent Do Food Consumption Patterns (Dietary Pattern) Affect Science Students' Academic Performance?

The academic performance of the students was determined by the students' scores. Table 6 shows that the mean score obtained by students was 58.38% (SD=8.5). The high standard deviation means that most of the scores obtained by students were not consistent with the mean score. The score of the students ranged from 28.4 % to 79.67%. On nutrition status, the scaling was made as, 1-3= high, 4-7= moderate and 8-10= low consumption of important food nutrients. In this study, the mean nutrition was 4.57 SD=1.08) and this falls within moderate consumption of food nutrient. The small standard deviation means that most of the students were consuming moderate amount of important food substances which were common to them and were consistent with their decision. The mode of 4.11 indicates majority of the students diet consumption Table 7 was moderate. Correlation test conducted to ascertain how nutritional status influenced academic performance has been presented in Table 7.

**Table 6:** Correlation of students' academic performance and nutritional status.

| Academic Performance | | | Nutritional Status |
|---|---|---|---|
| Academic performance Nutritional Status | Pearson Correlation | 1 | .647 |
| | Sig. (2-tailed) | | .000 |
| | N | 105 | 105 |
| | Pearson Correlation | .647 | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 105 | 105 |
| Correlation is significant at the 0.01 level (2-tailed). | | | |

Source: fieldwork Data, (2018).

**Table 7:** Chi-Square Tests.

| | Value | Df | p-value |
|---|---|---|---|
| Pearson Chi-Square | 7.879 | 3 | 0.049 |

**Source:** fieldwork Data, (2018).

Actual p-value significant is 9.0362x10-14and has been approximated as 0.000 in Table 7. In the Table 6, the academic performance and Nutritional Status (r=0.647), based on n=105 observations with pair wise non-missing values. Academic performance and Nutritional Status have a statistically significant linear relationship (p< .01). The direction of the relationship is positive (i.e., academic performance and nutritional status were positively correlated), meaning that these variables tend to increase together (i.e., proper nutritional status is associated with good academic performance). This shows food intake is an important element. In a research supporting nutrition and its effects on cognition, Wolpert and Wheeler [20,21] cited Gomez-Pinilla that diet, exercise, and sleep have the potential to alter brain health and mental function. Gomez-Pinilla stated that it stands to reason those changes in diet could be used to enhance cognitive abilities. His research has shown that Omega-3 fatty acids such as those found in salmon (fish), kiwi fruit, and groundnuts, provide many benefits in improving memory and learning, much of which occurs at the synapses.

### Hypothesis Testing Ho

Academic performance of students has no association with the nutritional profile of the students. With a Pearson Chi-Square value of 7.879 and a p-value=0.049 the Null hypothesis (H0) is rejected, and the Alternate hypothesis (H1) accepted. This shows a statistically significant relation between the nutritional status of students and how they perform academically Table 7.

## Conclusion

Based on the findings of the study, food consumption pattern of science students in the studied schools influenced their academic performance in a positively correlated manner. This suggests parents and school authorities need to plan students' diet to improve students' health and functioning of important body organs. Parents and teachers should assist their wards to overcome factors that inhibit them from eating nutritious meals.

## Recommendations

The following recommendations are outlined:

**a)** Parents should ensure that they provide their children with a well-balanced diet every day for healthy development.

**b)** Government and school authorities should design menu that would include more fruits and vegetables in senior high school in Ghana.

**c)** Since most of the youth have the appetite for food that are advertised, it is important for food and drugs board and the government to intensify their mandate of assess the effect of such food to children and the general public.

**d)** More education should be done to create the awareness of school children on the nutritional benefits of food.

## Acknowledgement

The authors thank the management and students of Potsin T. I. Ahmediyyah and Odupong Community Day Senior High Schools for their cooperation during the study.

## References

1. Saxton J (2000) Investment in education: Private and public returns.
2. Waseka, E L, Simatwa EM W (2016) Student Factors Influencing Academic Performance of Students in Secondary Education in Kenya: A Case Study of Kakamega County. Educational Research 7(3): 72-87.
3. Yamtinah S, Masykuri M, Shidiq AS (2017) Gender Differences in Students' Attitudes toward Science: An Analysis of Students' Science Process Skill using Testlet. Instrument. In The 4th International Conference on Research, Implementation, and Education of Mathematics and Science (4th ICRIEMS) (Vol.30003).
4. Bellisle F (2004) Effects of diet on behaviour and cognition in children. British Journal of Nutrition, 92(2): S227-S232.
5. Sorhaindo A, Feinstein L (2006) What is the relationship between child nutrition and school outcomes?
6. Gomez-Pinilla F (2008) Brain foods: The effects of nutrients on brain function. National Review of Neuroscience 9(7): 568-578.
7. Davis B, Melina V, Berry R (2010) Becoming raw: The essential guide to raw vegan diets. Summertown, TN: Book Publishing Company.
8. Ghosh S, Rakshit S, Bhattacharya M (2013) Academic performance and nutritional status-A case study on college students in North Tripura. IOSR J Res Method Educ 1(4): 57-68.
9. Kumar R (2011) Research methodology: A step-by-step for beginners (3rded.). London: Sage publication Ltd.
10. Erickson J (2006) Brain food: the real dish on nutrition and brain function. WisKids Journal, November/December.
11. Ajayi IA (2006) The influence of school type and location on resource availability and pupils learning outcome in primary schools in Ekiti State, Nigeria. Educational Thought 5 (1): 170-176.
12. Alves H, Boog M (2007) Food behavior in student residence halls: a setting for health promotion. Rev. Saude Publica 41(2): 197-204.
13. Battle J, Lewis M (2002) The increasing significance of class: The relative effects of race and socioeconomic status on academic achievement. Journal of Poverty 6(2): 21-35.
14. Brown JL, Beardslee W H, Prothrow-Stith D (2008) Impact of school breakfast on children's health and learning: An analysis of the scientific research.
15. Fishmen AS, Smith O, Torsheim T, Samdal O (2014) A school-based study of time trends in food habits and their relation to socio-economic status among Norwegian adolescents, 2001 inverted question mark 2009. The international Journal of Behavioral Nutrition and Physical Activity 11(1): 115.
16. Fitzgerald A, Heary C, Nixon E, Kelly C (2010) Factors influencing the food choices of Irish children and adolescents: a qualitative investigation. Health promotion Int. 25(3): 289-298.
17. Florence MD, Asbridge M, Veugelers P (2008) Diet quality and academic performance. Journal of School Health 78(4): 209-215.
18. Gustafson N (2010) Nutrition and mental health. In Encyclopedia of Mental Disorders.
19. Kabir A, Miah S, Islam A (2018) Factors influencing eating behavior and dietary intake among resident students in a public university in Bangladesh: A qualitative study. PloS one 13(6): e0198801.
20. Lahey M, Rosen S (2002) Dietary factors affection learning behavior.
21. Wolpert S, Wheeler M (2008) Food as brain medicine.UCLA Magazine Online.

**ISSN: 2574-1241**

DOI: 10.26717/BJSTR.2021.38.006086

**Ameyaw Y.** Biomed J Sci & Tech Res