Nutritional Quality and Academic Performance of Primary School Children in Jalingo Metropolis: A Quantitative Approach

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Abstract

Issues surrounding academic performance of learners at various levels of education have become a source of concern to all and sundry. The students’ results in the public domain reveal that beyond school’s factors, teacher’s factors, family background and students related factors; there are other factors affecting academic performance of learners. Therefore, this paper took a quantitative approach to examine the influence of nutritional value of food intake on academic performance of primary school children in Jalingo metropolis. The study aimed at unravelling links between children’s feeding habit and their academic attainment. In order to achieve the objectives of the study, two (2) research questions and two (2) research hypotheses guided the study. It was a survey research design which had thirty-one (31) public primary schools as targeted population. Out of which, seven (7) primary schools were randomly selected with fifty (50) respondents from each of the schools. Hence, three hundred and fifty (350) respondents formed sample size for this study. Simple percentage and mean were used for answering research questions while Chi-square ($X^2$) analysis was employed for testing research hypotheses at 0.05 significant level. The findings revealed that nutritional quality significantly influence concentration level of primary school children during teaching; and that
nutritional quality strongly and significantly influence academic performance of primary school children in the study area. Based on this study, among others, it was recommended that parents should ensure that their children are fed with nutritional foods as it is capable of enhancing on their cognitive development- thereby improving their academic performance. To this end, the paper concluded that concentration level and academic performance of primary school children could be upgraded, if due attention is given to the nutritional quality of their food intake.

**Keywords:** Nutritional value; concentration; cognitive development; academic performance; primary school children.

**Introduction**

Undoubtedly, learners’ academic performance is one of the factors for determining education quality of a nation. Of course, numerous factors influence on academic performance of learners ranging from school related factors (e.g., available facilities, teacher’s methodology, location, etc); government policy (e.g., adequate supervision and monitoring, enrolment rate, sufficient funding, etc); home related factors (parents’ involvement, socio economic status, parental education, etc); to student’s related factors (learner’s ability, concentration level, peer influence, etc). Perhaps Aina and Olanipekun (2016); Fitday (2016); and Dobbing (2014) were right to have identified students’ factors as the main factors influencing the learning outcome in school and overall academic achievement of student. Simply put, learners are responsible for their own learning as the amount of what they learn is dependent on their activeness and participation in the classroom activities.

The assertion above shows that most of academic problems faced by pupils resulted from lack of concentration which usually is fuelled by poor nutrition and lack of proper eating habit. Whenever, pupils are not well-fed, it may be difficult to achieve the aim of education which, supposed to be an instrument for developing an individual in social, mental, physical, emotional, moral and psychological aspects. Lack of attentions during classroom activities while at school can hinder the purpose of education that is meant to guide the pupils to understand the difference between good and bad attitude, right and wrong behaviour. Obviously, education
remains the tool to make the peoples gain empirical knowledge about the useful elements of life and how to make use of them (Olanipekun, Atteh, Onabanjo, & Ohiemi, 2014).

The statement above was reflected by the Federal Republic of Nigeria (National Policy on Education, 2014), when it described education as an instrument for national development, along with the interaction of persons and ideas. Also, education was meant to foster the worth and development of the individual, for each individual’s sake, and general development of the society. Likewise, education is meant to train the mind of peoples to understand the world around as well as acquisition of appropriate skills and competencies to live and contribute to the development of the society. All these laudable goals of education are achievable only when children are keenly involved in teaching and learning activities.

Despite the well covered objectives, most students in our schools today are finding it difficult to concentrate and do well in their studies and this is affecting their academic achievement and hindered attainment of objectives of education. Many of the academic problems faced by students are engineered by poor nutrition and lack of proper eating habit (Aina & Olanipekun, 2016). Eating habits in this context is considered in terms of what types of food are eaten, in what quantity and when (Collins English Dictionary, 2016). It could therefore be said that poor eating habit is the way and manner in which people eat, the food they eat, and when they eat which, subsequently affects their health negatively. Little wonder, Kleinman (2015) highlighted factors such as individual preference, cultural influence, social influence, religious influence, economic influence, environmental influence and even political influence as determining variables of eating habit. To this end, eating habit is a potent factor affecting learners’ concentration level thereby negatively impacting on the outcome of academic performance.

Academic performance is measured through continuous assessments and examinations. Academic performance can be seen as a problem when students are not able to reach the short – term or long – term goals in their education (Oluremi, 2013). When students do not perform well in school, it may be that such students did not study hard for the examination or test and also may be caused by poor concentration in school, poor memory, poor ability to follow through topics and also poor coordination in class.
However, the federal government of Nigeria through its recent school feeding programme drummed the support for the argument of “well feed – well perform”. Students’ academic performance can greatly be affected by students’ disciplines, students’ interaction with others, and students’ participation in school activities and students’ assimilation in classroom (Arshad, 2015). Conversely, there is still scepticism about whether school participation by students, students attention in classroom, interpersonal relationship and lesson assimilation can be attributed to feeding habit among students. In other words, the extent at which nutritional quality affects academic performance of primary school children is not well documented in Jalingo metropolis. Therefore, the current study is an effort to determine whether feeding habit among primary school children really affect their various schools activities as well as their academic achievement.

**Underpinning Theory**

This study is hinged on Socio-Cultural Theory propounded by Vygotsky (1978) and Theory of Food by Premack Woodruff (1978). Vygotsky (1978) postulated that nutrition and academic performance are affected by an array of socio-cultural factors. Distinct differences in nutrient consumption appear both internationally and among population subcultures because of food availability, preference, and social norms; these dietary trends are especially prominent in comparisons of socioeconomic status and ethnicity. Likewise, academic performance varies greatly among cultures and subcultures. Vygotsky (1978) explains these phenomena by saying that a person’s context shapes his or her behaviour by influencing eating habits and determining priorities in learning. He argues, “a culture defines what knowledge and skills children need to acquire” and that values and processes differ among different races, social classes, dual – career versus one – career families, rural versus urban communities, single – parent versus two – parent families, and so on” (Vygotsky, 1978). Socio-cultural factors have been thoroughly examined through the discussion of malnutrition on academic performance. This theory is relevant to this study because, it provides a context for physiological and cultural approaches for how food affects human brain function and capability as well as sociocultural attitudes toward food and academic performance.

On the other hand, Premack’s theory of food stated that human eat not because we have to survive but because our complex language – based cultural
environment embeds food in an extensive web of other cognitive associations (Premack, 1978). For this author, food is an internal, cognitive representation of our diets in our minds. All primates to some extent learn how to eat as they grow up, observing what their mothers and other members of their social group do with food items. Although physiology is obviously important, but the socio-cultural context (and ultimately the cognitive context) play a large role in defining what is and is not food, and what should or should not be eaten. Humans need a food not simply for sustenance, but to make use of one of the basic necessities of human social existence (Harris & Ross, 1987 cited in Osendarp, Murray-Kolb & Black, 2015; Taras & Potts-Datema, 2015).

The implication of theory of food is that it provides us the perspective for understanding why dieting is so difficult. It forms as children grow up and implicitly acquire knowledge and habits associated with food and eating. In the same way that children acquire their first language, theory of food becomes enmeshed in the cognitive makeup of an individual. According to Osendarp et al. (2015), adopting a new diet, in effect modifying a food, is to some extent like learning a second language, except more so it is like replacing a first language with a new one. Theory of food is likely not as cognitively ingrained as language, but changes in it nonetheless could have profound effects on overall cognition. Thus, as humans evolved to be actively engaged with their food environments. Interactions with and within these food environments can be extraordinarily complex and play multiple roles including motivating learners and enhance cognitive capability.

Uwannah and Mbegbu (2018) argued that food has been serving people to mediate not only by ecological factors, but also by the technological, socio-cultural, and ultimately, cognitive contexts in which food is thought, acquired, processed, distributed, and eaten. Thus, the theory of food is a cognitive model of how the brain organizes this complex environment. Human adult cognition is an extraordinary biological phenomenon. It emerges fully over the course of the development via the interaction of multiple discrete, but necessarily overlapping, critical neuro-cognitive networks. These networks evolved in response to various selection pressures, many of which were modified or intensified by the intellectual, technological, and socio-cultural environments that arose in connection with the evolution of genus homo-networks related to language and theory of mind clearly plays an important role in adult cognition. Given the critical importance of food to both basic survival and cultural
interaction, nutritional value of food intake is germane to cognitive
development and academic exercise of such children.

**Literature Review**

Scholars and researchers in the field of education have underscored significant role of nutritional value of food intake to academic activities of children. For instance, Viktor (2016) averred that feeding habit of learners may affect their state of minds. Stressing that when learners are well-fed, their attention and retention are expected to be high and their concentration and participation in classroom activities is expected to be high. That is, there is strong relationship between eating habit and concentration level, retention level as well as rate of participation in classroom activities by the children. This is supported by Fleck (2016) and Johnson (2014) who concluded that children at younger ages are sensitive to feeding habit than grown up learners. For Aanstoos (2010), significant difference usually occurs between the response of primary school children to feeding habit than students in tertiary institutions. Put differently, primary school children are intolerant to poor feeding habit as it reflects on their level of concentration and participation in classroom activities.

Little wonder, Solomon et al. (2016) inferred that matured learners show more tolerance to feeding challenges than younger learners as reflected in their concentration level during lesson. This explains why Viktor (2016) suggested that the educators at basic education level should ensure that feeding patterns for their learners are adequate and timely. This is because delaying feeding time while at school may alter children’s attention during the lesson- thereby affecting their participating in teaching and learning process. For Alaimo, Olson, Frongilo and Briefel (2011), schools should observe their time schedule for breaks in order to enable children haaave enough time to take their foods. Even the grown up learners deserve adequate time for feeding, the study by Johnson (2014) conducted among medical students in Dominca revealed that students’ concentration in lecture room reduced when students were made to skip their breakfast meal in two consecutive days. This placed credence to the fact that poor feeding habit may affect students of all levels, only that the matured students could endure hunger for some periods than younger students. From the foregoing, it is glaring that good feeding habit is important to students’ academic performance. In support of this, Solomon et al. (2016) maintained that students who ate breakfast have improved attention in late morning
performance task, retrieve information more quickly and perform better in academic tasks. For Lixandru (2016), even drinking enough water stimulates the nervous system and improves the functionality of the brain while Borreli (2013) argued that late night eating affects the sleeping pattern of the students, which further translates to poor attention in the class as well as academic performance.

At this juncture, it must be emphasized that feeding habit contributes largely to inner power and reading intensity of a student. For any student to attain good academic performance, there must be enough practices, self-study and group works which all depend on the state of mind and readiness of the students. Any student that participated hurtfully among his/her peer could be a student that surfer from hunger (Alaimo, 2011). This explains why David (2012) argued that malnutrition may result in long-term neural issues in the brain, which could impact a child’s emotional responses, reactions to stress, learning disabilities, and other medical complications that make learning quite impossible.

In a specific study, Amar (2016) discovered that malnourished children were found to have delays in vision, fine motors skills, language skills and personal-social skills, and their performance in academic is generally below average. Recently, the study by Williams (2019) discovered that about 62% of surveyed adolescents actually reported poor food habits, chronic illnesses, and lower school achievements. Fleck (2016) suggested that foods should be readily made available for pupils both at school and home, since lack of food can actually inhibit child development. Not only are unhealthy foods proven to impact academia, but research also proves that a poor diet also impacts a child’s attitude and behavior, both in and outside of school (David, 2012).

With widespread concern about student health and academic performance, there are now initiatives calling for government intervention in school feeding program. Fleck (2016) suggested that school feeding program should be incorporated into both public and private schools across the country. Such a program is expected to create healthier school environments that can enhance students learning rate and their performances. David (2012) argued that parents at various homes could enhance school feeding by ensuring that their wards took proper breakfast and go to schools with nutritious food suitable for the growth and development of learners. The pupils feeding habit and students’ academic performance are directly related and the impact of feeding habit of students on their performance is always enormous. Amar (2016) concluded that
nutrition is a big issue proven to have restricted impact on intellectual development of kids when not receiving the nutrients that are required for brain development. Parents must ready to keep their kids healthy for the future through serving nutritious food.

According to Amy (2016), diet, exercise, and sleep have the potential to alter brain health and mental function. Gomez–Pinilla (2012) stated that it stands to reason that 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, kiwi fruit, and walnuts, provide many benefits in improving memory and learning, much of which occurs at the synapses. Omega – 3 fatty acids support synaptic plasticity and seem to positively affect the expression of several molecules related to learning and memory that are found on the synapses. Omega – 3 fatty acids are essential for normal brain function. The article states that a deficiency in Omega – 3 fatty acids can lead to increased risk of attention – deficit disorder and dyslexia. According to Gomez – Pinilla (2012), children who had an increase of Omega – 3 fatty acids performed better in reading, spelling, and had fewer behavioral problems.

Wolpert and Wheeler (2008) also highlighted a study in England that found school performance improved among a group of students receiving Omega – 3 fatty acids. The article also tells of an Australian study of 396 children between the ages of 6 and 12 who were given drinks with Omega – 3 fatty acids along with other nutrients like iron, zinc, folic acid and vitamins A, B6, B12, and C. These students showed higher scores on tests measuring verbal intelligence, learning skills, and memory after six months and one year as compared to a control group of students who did not receive the drink (Wolpert & Wheeler, 2008). Gomez – Pinilla (2012) suggested that diets high in trans-fats and saturated fats negatively affect cognition. These trans-fats are found in common fast food and most junk foods. Through these trans-fats, junk food affects the brain synapses as well as many molecules that aid in learning and memory. A diet low in trans fats and high in Omega – 3 fatty acids can strengthen synapses and provide cognitive benefits (Wolpert & Wheeler, 2008).

Wolfe, Burkman and Streng (2012) stated that proper nutritional support is important to allow the brain to function at its highest ability and to enhance learning. They suggested that it didn’t take much complication or obscurity through expensive foods and supplements to help students reach their potentials; healthy nutritional habits learned early in life help endure normal
physiological and neurological growth and development, which translated into students’ achieving optimal learning, defined as the abilities to recall information, to problem solving, and to think critically. Wolfe et al. (2012) pointed out the importance of utilizing the Food Guide Pyramid for Young Children, which is an adaptation of the Food Guide Pyramid from the U.S. Department of Food and Agriculture. This food guide focuses on food preferences and nutritional requirements of young children and needs to be the foundation of their diets (Wolfe et al., 2012).

Shore (2012) stated that several dietary components support brain function and neurotransmitter activity, and that scientists recommend a wide range of foods as nutrient sources; the most important known today are protein, fat, B vitamins, iron, chlorine, and antioxidants. Offering students the right food choices and helping them develop positive, healthy eating habits will support optimal functioning of the brain. Eating breakfast helps students to eliminate or reduce stomach pain, headache, muscle tension, and fatigue, all which lead to an interference with learning. School personnel have the perfect access to students’ breakfast eating habits and need to utilize the opportunity to teach students good breakfast eating habits, whether at school or home. Smith (2012), highlighted the negative impact of skipping a meal on child development and performance. Without an adequate daily intake of nutrients from food, the body puts learning on a lower shelf below its need to sustain life-support functions. Therefore, in many cases, skipping a meal negatively affected the body and its learning functions. Uwannah and Mbegbu (2018) concluded that as many as half of low-income elementary students skipped breakfast and that children who eat a good breakfast at school perform better on standardized tests.

Chinyoka (2014) called attention to school food programs and contend that such programs need support, not disdain. Every lunch must contain at least one – third of the Recommended Daily Allowance (RDA) for specific key nutrients, and every breakfast must contain one – fourth of the RDA for specific nutrients. School meals must conform to the U.S. Dietary Guidelines and on a weekly average, no more than thirty percent of the calories can be from fat (Chinyoka, 2014). To sum up Chinyoka’s findings, the performance possibilities of children are very dependent upon their health and well-being; minds that have been given the proper nutrition will perform better on tests and general classroom tasks. As to why diet may be linked with academic achievement, the observed associations are in line with the knowledge that various dietary components,
including micronutrients such as folate, iron, and omega 3, have essential roles in brain development and functioning (Chinyoka, 2014). Needless to say that brain requires significant and regular amounts of energy to function optimally (see Allison & Lamport, 2012).

The associations between higher consumption of nutrient rich foods, such as fruits and vegetables, and lower consumption of nutrient poor foods, such as junk foods, could then be explained by higher intakes of essential micronutrients. In addition, the associations of consuming breakfast and regular meals with higher academic achievement could be that more frequent and regular eating occasions provide a vehicle for the delivery of these nutrients, as well as adequate energy to fuel cognitive function (Fitday, 2016). In particular, studies in both children and adult populations have demonstrated that individuals who consume breakfast regularly have higher intakes of a range of micronutrients, including folate and iron (Nyandwi, 2014). Other factors known to influence academic achievement and/or diet should also be acknowledged here, such as socio-economic status (SES), gender, and other health behaviours (Petengine, 2016). For example, lower SES is associated with both lower academic achievement and poorer diet quality (Williams, 2019), reflective of the availability of social and economic resources, while several health behaviours, in particular, being physically active and attaining adequate sleep, are known to improve cognitive functioning, and subsequently, academic achievement (Fitday, 2016). Overall, existing studies on this topic tend to be lacking in their consideration of these and other potential confounding factors.

**Statement of the Problem**

For many years there has been concern about the problems faced by most of students that affect their academic achievement. Different empirical efforts have consistently focused on determining the genesis of problems and poor performance of students in academic especially among the pupils of early education (pre – primary and primary). As more and more researches have been tailored toward determining rationale behind poor pupils attentions while at schools and poor performance. Most of these studies focused on pupils school readiness, parental background, schools factors, teachers factors as well as child development. Very few empirical attentions have been paid toward effect of children feeding habit and nutritional quality on their academic performance in schools. It may not be impossible for lack of balance diet to affect sensory
nerves of bodies, which works directly with neural system of the body of an individual and may affect the child participation in classroom activities as well as overall performance in academic. Therefore, this study digs into nutritional quality and academic performance of primary school children in Jalingo metropolis, Taraba State.

**Research Objectives**
Specifically, the study on the nutritional quality and academic performance of primary school children in Jalingo metropolis will ascertain:

1. Influence of food intake on concentration level of primary school children during teaching.
2. Influence of food intake on academic performance of primary school children.

**Research Questions**
The following research questions are raised to guide the study:

1. What is the influence of food intake on concentration level of primary school children during teaching?
2. What is the influence of food intake on academic performance of primary school children?

**Research Hypotheses**
The following null hypotheses will be tested at 0.05 level of significance:

- **H₀₁**: Food intake has no significant influence on concentration level of primary school children during teaching.
- **H₀₂**: Food intake has no significant influence on academic performance of primary school children.

**Methodology:**

**Design**
The survey research design was adopted for this study. This is deemed appropriate for a study that investigated the opinion, attitude, activities and characteristics of children in relation to academic performance on the basis of their nutritional quality.
Population
The population of this research work comprises of 31 public primary schools in Jalingo metropolis, Taraba State. The study focused on penultimate class who still have one academic year to complete primary education. Therefore, primary V pupils in 31 public primary schools in Jalingo constitute targeted population for this study.

Sample and Sampling Technique
The study randomly selected seven (7) primary schools in the study area while simple random sampling technique was used to select 50 primary V pupils in each of the selected seven (7) primary schools. On the whole, the sample size stood at three hundred and fifty (350) primary V pupils.

Instruments
A researcher-developed questionnaire and the results of previous transitional examination were used as instruments for this study. The questionnaires was structured in 4–point Likert scale, which is, SD=Strongly Disagree, D=Disagree, A=Agree and SA=Strongly Agree. The questionnaire was sectioned into A, B, and C. Section A constitute a 3-item on demographic information of respondents, and section B focus on items seeking responses from children regarding effect of food intake on concentration, while Section C comprise of items seeking effect of food intake of children’s performance.

Validity and Reliability
The instrument was validated by three experts in terms language structure and contextual accuracy of terms usage. Hence, the instrument went through face and contents validity before using it for data collection. In order to obtain the reliability of instrument, the pilot study was conducted in three primary schools in Zing Local Government Area, Taraba State. The responses that were obtained from the pre-study survey were subjected to the Cronbach Alpha’s internal consistency test via SPSS (statistical package for social sciences), which yielded 0.78 reliability coefficient.

Analysis
The data collected for the study were analysed using frequency, percentage and mean as well as Chi-square analysis ($X^2$). The mean was used to answer
research questions with acceptance value of 2.50 and the null hypotheses were tested using Chi-square analysis at 0.05 level of significance (computation was done with SPSS package).

Data Presentation

Answering of Research Questions

Research Question One: What is the effect of food intake on children’s concentration to study during teaching?
Table 1: Pupils’ Perception on the Effect of Food Intake on the Classroom Concentration in Public Primary School in Jalingo Metropolis, Taraba State.

<table>
<thead>
<tr>
<th>S/n</th>
<th>Items</th>
<th>SA Fx (%)</th>
<th>A Fx (%)</th>
<th>D Fx (%)</th>
<th>SD Fx (%)</th>
<th>Mean</th>
<th>Rmk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It is difficult to follow class teachers whenever one is feeling hungry.</td>
<td>231(66%)</td>
<td>65(19%)</td>
<td>21(6%)</td>
<td>33(9%)</td>
<td>3.41</td>
<td>Agree</td>
</tr>
<tr>
<td>2</td>
<td>Most of the time my attention is away from classroom when I’ve not taken my food in time.</td>
<td>76(22%)</td>
<td>211(60%)</td>
<td>56(16%)</td>
<td>7(2%)</td>
<td>3.02</td>
<td>Agree</td>
</tr>
<tr>
<td>3</td>
<td>In most of the times I have little interest in classwork if I’m not given desired food.</td>
<td>45(13%)</td>
<td>243(69%)</td>
<td>41(12%)</td>
<td>21(6%)</td>
<td>2.89</td>
<td>Agree</td>
</tr>
<tr>
<td>4</td>
<td>Whenever I’m feeling hungry, I do feel dizzy in the class.</td>
<td>76(22%)</td>
<td>219(63%)</td>
<td>43(12%)</td>
<td>12(3%)</td>
<td>3.03</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>I get annoyed with classroom activities whenever I missed my desired food.</td>
<td>243(69%)</td>
<td>45(13%)</td>
<td>19(5%)</td>
<td>43(12%)</td>
<td>3.39</td>
<td>Agree</td>
</tr>
</tbody>
</table>

Table 1 presents the respective pupils’ perception on the effect of food intake on the classroom concentration in public primary school in Jalingo Metropolis, Taraba State. The results showed that 66% of sampled primary V pupils expressed their agreement to the assertion that it is difficult to follow class
teachers whenever they were feeling hungry (mean =3.41). Also, 60% of sampled pupils expressed that in most of the time, their attention is away from classroom when they’ve not taken food in time (mean =3.02). More so, 69% of sampled pupils reaffirmed that their interest in classwork reduced when not fed with desired food (mean =2.89). Likewise, 63% of pupils expressed that if not fed with quality food, this can result to sleeping while in the classroom (mean=3.03). Not able to get desired food can lead to annoyance of pupils in the classroom. This fact was buttressed by 69% of sampled pupils across public primary schools in Jalingo metropolis, Taraba State (mean = 3.39). Thus, all items on table 1 have mean value which is greater than 2.5, indicating that the pupils unanimously agree that poor food intake affect their concentration in the classroom.

**Research Question Two:** What is the effect of food intake on children’s academic performance in primary schools?

Table 2: Pupils’ Perception on the Effect of Food Intake on Academic Performance in Public Primary Schools in Jalingo Metropolis, Taraba State

<table>
<thead>
<tr>
<th>S/n</th>
<th>Items</th>
<th>SA Fx (%)</th>
<th>A Fx (%)</th>
<th>D Fx (%)</th>
<th>SD Fx (%)</th>
<th>Mean</th>
<th>Rmk</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Hungry affect my concentration during examination</td>
<td>199(57%)</td>
<td>25(7%)</td>
<td>8(2%)</td>
<td>118(34%)</td>
<td>2.87</td>
<td>Agree</td>
</tr>
<tr>
<td>7</td>
<td>Not eating food at the right time prevent my recalling rate</td>
<td>218(62%)</td>
<td>53(15%)</td>
<td>15(4%)</td>
<td>64(18%)</td>
<td>3.21</td>
<td>Agree</td>
</tr>
<tr>
<td>8</td>
<td>When under duress of hunger it is difficult to read and understand the instruction in examination</td>
<td>77(22%)</td>
<td>232(66%)</td>
<td>5(1%)</td>
<td>36(10%)</td>
<td>3.00</td>
<td>Agree</td>
</tr>
<tr>
<td>9</td>
<td>I always experience inconsistency during examination when feeling hungry</td>
<td>243(69%)</td>
<td>36(10%)</td>
<td>8(2%)</td>
<td>63(18%)</td>
<td>3.31</td>
<td>Agree</td>
</tr>
</tbody>
</table>
Table 2 presents the perception of pupils on the effect of food intake on academic performance in public primary schools in Jalingo Metropolis, Taraba State. The results showed that 57% of pupils reaffirmed that when not well fed, this affects their concentration during examination (mean = 2.87). Also, 62% of sampled pupils expressed that if not eating food at the right time, this prevents their recalling rate (mean = 3.21). Likewise, 66% of pupils expressed that when under duress of hunger it is difficult to read and understand the instruction in examination (mean = 3.00). Also, 69% of pupils expressed that they experience inconsistency during examination when feeling hungry (mean=3.31). More so, 64% of pupils expressed that it is difficult to write well when not well fed during examination (mean =3.02). The results on the table show that each item got mean value above 2.50, which indicated the unanimous agreement view of pupils from public primary schools in Jalingo metropolis to the effect of food intake on their performance.

Testing of Null Hypotheses

H_{01}: Nutritional food has no significant effects on children’s concentration to study during teaching

Table 3a: Cross-Tabulation of Quality of Food and Level of Children’s Concentration in Public Primary Schools Jalingo Metropolis, Taraba State

<table>
<thead>
<tr>
<th>Quality of Food</th>
<th>Nutritious</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>64</td>
<td>48.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48</td>
<td>36.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>14.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>131</td>
<td>100.0%</td>
</tr>
<tr>
<td>Non-Nutritious</td>
<td></td>
<td>53</td>
<td>24.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>78</td>
<td>35.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88</td>
<td>40.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>219</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>117</td>
<td>33.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>126</td>
<td>36.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>107</td>
<td>30.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>350</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
The results on table 4a reveal the cross-tabulation between the quality of food and level of children’s concentration in public primary schools in Jalingo metropolis, Taraba state. The results showed that in the category of children with nutritious food 48.9% of them recorded higher concentration; whereas, in the category of those children with non-nutritious quality food, 40.2% of them recorded low concentration. This result shows the initial possibility of the effect of quality of feeding and children’s concentration.

Table 3b: Result of Chi-square analysis on the effect of quality of food on children’s concentration level in public primary schools in Jalingo metropolis, Taraba state

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>32.608</td>
<td>2</td>
<td>.000</td>
</tr>
<tr>
<td>Eta value</td>
<td>.305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No of Valid Cases</td>
<td>350</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 40.05*

The results of chi-square analysis on the effect of quality of food on the children’s concentration level in public primary schools in Jalingo metropolis, Taraba state is presented in Table 4b. The result reveal a chi-square value 32.608, at degree of freedom of 2, p-value of 0.000. Since the calculated p-value 0.000 lower than hypothetical p-value 0.05, the null hypothesis is rejected. This implies that there is significant effect of nutritional quality on the children’s consternation level in public primary schools in Jalingo metropolis, Taraba state. Also, the Eta value 0.305 indicated that on the basis of food intake, about 30.5% concentration level can be predicted while in the classroom.

**H02:** Nutritional food has no significant effects on children’s academic performance in public primary schools in Jalingo Metropolis, Taraba State.
The results on table 4a reveal the cross-tabulation between the quality of food and children’s academic performance in public primary schools in Jalingo metropolis, Taraba state. The results showed that in the category of children feed with nutritious food, 45.8% of them performed above average, while in the category of those children with non-nutritious quality food, 41.6% of them performed below average. This result shows the initial possibility of the effect of quality of feeding and children’s academic performance.

Table 4b: Result of Chi-square analysis on the effect of quality of food on the children’s academic performance in public primary schools in Jalingo metropolis, Taraba state

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>22.251</td>
<td>.000</td>
</tr>
<tr>
<td>Eta value</td>
<td>.252</td>
<td></td>
</tr>
<tr>
<td>No of Valid Cases</td>
<td>350</td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 43.42

The results of chi-square analysis on the effect of quality of food on the children’s academic performance in public primary schools in Jalingo metropolis, Taraba state is presented in Table 4b. The result reveals a chi-square value 22.251, at degree of freedom of 2, p-value of 0.000. Since the calculated p-value 0.000 lower than hypothetical p-value 0.05, the null hypothesis is rejected. This implies that there is significant effect of feeding quality on the children’s academic performance in the public primary schools in Jalingo.
metropolis, Taraba state. Also, the Eta value 0.252 indicated that on the basis of food intake, about 25.2% of children’s academic performance can be predicted while taken examination.

**Discussion of Findings**
The findings from this study showed that food intake by children affect their concentration level during teaching and learning in public primary schools in Jalingo metropolis, Taraba state. The finding specifically indicated that lack of food affects children’s attention, lead to low interest and making children to sleep during teaching and learning. The findings of current study agrees with Burrows et al. (2017) who established that feeding habit and quality of food intake directly affect learners’ participation in the classroom activities. Also, study by Schmitt (2010) and Geierett (2017) found that lack of quality food intake hampered learners’ concentration while at schools. The earlier finding by Shore (2012) related poor classroom participation with poor feeding habit among students. Geierett (2017) concluded that pupils at lower education level react significantly to the food intake than those in higher education. The psychology effect of food intake can affect the concentration of pupils while in the classroom, this agrees with the conclusion drawn by Dobbing (2014) and Lixandru (2016) in their respective study that intended to determine relationship between food intake and pupils state of minds while in the classroom.
The findings from this study showed that food intake has significant effect on children’s academic performance in public primary schools in Jalingo metropolis, Taraba state. Specifically, lack of food intake affects children’s concentration during examination, prevent them from reading instruction properly on question paper, affect their recalling rate and makes them feel uncomfortable during examination. This agreed with the submission made by Dobbing (2014) and Lixandru (2016) that proper feeding habit have effect on cognitive ability of students. Also, the current study agreed with the submission made by Geierett (2017) that nutritious food can be used to enhance cognitive abilities of students irrespective of their age. Likewise, the study by Wolpert and Wheeler (2008) established that proper feeding habit can enhanced learners’ interest as well as cognitive capability. Likewise, studies by Macarena et al. (2016), Nyandwi (2014) and Olanipekun et al. (2014) established that
neither male nor female students’ responds differently to good feeding habit. Above all, the current study has shown that children benefitted from nutritious foods and it has significant and positive impact on the children’s academic achievements.

Contribution to Knowledge
From the foregoing, it is evident that nutritional value and food intake of children is a determinant of students’ academic performance. Thus the current study has shown that apart from earlier identified factors such as learners’ readiness, teachers’ factors, schools’ factors and government factors that significantly affect the students’ performance, children’s feeding habit if not put into consideration can undermine the effectiveness of other learning features and measures put in place by education planners. That is, nutritional value of food intake does not only adversely affect health status of children but could hamper on their educational pursuit.

Suggestions for Way Forward
Based on the findings of this study, the following recommendations are made:-

i.) The parents should ensure that they feed children with balanced diet food regularly to improve cognitive development.

ii.) The authorities in Taraba state should assist the parents by offering free feeding for the children while at school to further enhanced their interest in learning and develop their cognitive development accordingly.

Conclusion
From the going, it could be deduced that as far as Taraba State is concerned, nutritional value of food intake significantly impact on academic performance of primary school children. In fact, the study underscored the fact concentration level of primary school children is greatly affected by the nutritional value of food intake, which negatively impacts on their classroom activities and by extension academic performance.

References


Shore, S. J. (2012). Decreased scholastic achievement in overweight middle school students in Minnesota, USA. *Obesity*, 16, 1535-1538.


