

# EFFECT OF NUTRITION EDUCATION ON THE CONSUMPTION PATTERN OF STUDENTS OF SECONDARY SCHOOLS IN IKOT OKPORA OF BIASE LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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## ABSTRACT

### Introduction

This research on effect of nutrition education on the consumption pattern of secondary school students in Ikot Okpora in Biase Local Government Area of Cross River State was aimed to investigate the types of food available in Ikot Okpora.

### Methodology

Survey and purposive sampling was used to select three hundred and twenty students of the school since the number was small and one hundred (100) parents. Descriptive statistics, percentages and independent paired sample t-test was used to separate and compared.

### Result

The result of the study showed that majority of the parents were teenagers (36%) who were mostly farmers/traders (40/26%) respectively and who are majorly low income earners (N15,000,00) per month. A significant increase in some food items such as dairy products, vegetables, legumes, meat and fish product, pastas, baked products after and a reduction of consumption in food items of carbohydrates such as starchy roots a tubers, cereals, sweets/sugars. This implied that nutrition education had effect on the consumption pattern of the secondary school students. This finding also showed that nutrition education had effect in reducing the amount of carbohydrates and increasing the consumption of protein foods among the young students. The increase in baked products and pastas consumption could be allowed to enable the students take some snacks while in school during brake time. Increase in the consumption of fat and oil (margarine) should be encouraged as most margarine are fortified with some micro-nutrients. The excessive consumption of sweets and sugars should be discouraged as this could lead to dental carries especially in children and chronic diseases like obesity, diabetes, etc. The increase in the consumption of certain food items especially meat, and fish products and healthy snakes would lead to the healthy growth and development of the secondary school students. This is because, this is another stage of growth spurt, to enable them developing optimally, reduce micro-nutrient efficiencies, stunting and wasting, etc.

### Conclusion

Nutrition education should be intensified both in schools and community. School feeding programme should be implemented in the state/federal schools, so as to encourage the students to eat variety of meals.

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## INTRODUCTION

### Background of the study

Nutrients contained in foods are the major sources of good nutrition. Good nutrition involves consuming a variety of foods in appropriate amounts (Answer, 2006). The food we eat supply us with substances called nutrients such as energy, protein, fat, vitamins, minerals and water. These nutrients when they interact with the cells of the human body lead to the proper functioning of the various body parts and general health.

The most important aim of any government of any country is to achieve reasonable level in the standard of living and general wellbeing of every citizen through self-sufficiency in food production and consumption. However, this cannot be feasible without sustainable food security and adequate nutrition. Food security, a fundamental concept has been defined as access of all individual at any time to sufficient nourishing food for healthy and active life through available foodstuff and quality diet, the stability of supplies overtime and space, and the access of food produced at home or purchased (Honfoga and Boom, 2003). Adequate food and good nutrition is a fundamental human right (Kidsheth, 2007). Under nutrition is a major threat to health and wellbeing not only in the middle and low income countries but also globally (ACC/SCN, 2006; SCN, 2004). The ever-increasing levels of household food insecurity are contributing to less frequent and inappropriate feeding or rural dwellers.

West African's diverse agricultural ecosystem provide a wide range of indigenous and traditional foods which if effectively utilized and managed can increase availability, expand household food choice and nutrition (kurwijila, 2004; smith, Eyzaguire, Matig and Johns, 2006). Malnutrition during early life lead to permanent stunting in growth; improved health and nutrition among children contribute to high enrollment, better school attendance, low rates of dropouts and improved performance in academic work as well as to social equity and economic growth (Mwiria, 2005).

Major foods from agricultural ecosystem provide an insight into the wide array of under-utilized indigenous and traditional foods. However if the heds of households in the rural areas do not provide enough food for their household members, it limits the ability of individuals and families to carry out their functions especially for the school children (12-

18). This may result to reduction in the level of agricultural production, which is a function of agricultural labour force. This study therefore, is aimed at investigating the effect of nutrition education on consumption pattern of secondary school children in Ikot Okporo of Biase Local Government Area of Cross River State.

The name Biase means sons of the father. Biase was created out of Akamkpa Local Government Area in the 1982. Biase in the south is boarded by Akamkpa in the west by Odukpani and Ebonyi state, and in the north by Yakurr and Abi Local Government Area.

### STATEMENT OF PROBLEM

Adequate food and good nutrition is a fundamental human right under nutrition is a major threat to health and wellbeing not only in the middle and low income countries but also globally. The ever increasing levels of household food insecurity are contributory to less frequent and inappropriate feeding of rural dwellers.

West Africans diverse agricultural ecosystem provide a wide range of indigenous and traditional foods which if effectively utilized and managed can increase availability, expand household food choice and nutrition. Most often, due to poor nutrition, children and adults alike are vulnerable to disease and death. Malnutrition during early life leads to permanent stunting in growth. Improve health and nutrition among children contribute to high enrolment, better school attendant, low rates of dropouts and improved performance in academic work as well as to social equity and economic growth.

Nutrition education can help people to make informed choices, eat variety of foods and make voluntary life changes due to the availability of starchy foods (carbohydrates) mostly in the rural areas, the recent economic recession and lack of nutrition knowledge of food nutrition.

Most students are not properly fed from their homes and in addition, lack of school feeding programmes/implementation has gone a long way to affect the nutritional status and health of the students (children). Therefore, this work is aimed at finding a solution to malnutrition in the early life of children (students) through nutrition education.

### PURPOSE OF STUDY

This work is aimed to study the effect of nutrition education on the food consumption patterns of secondary school children.

The research specifically seeks to determine:

1. the types of foodstuff available in the community;
2. the students feeding patterns;
3. students' food preferences;
4. the frequency of consumption of the students.

### **RESEARCH QUESTIONS**

1. Does the availability of foodstuff affect the consumption pattern of the students?
2. Does nutrition education have effect on feeding information of the students?
3. Does nutrition education have effect on the food preference of the students?
4. Does nutrition education have effect on the frequency of consumption of the students?

### **HYPOTHESES**

1. There is no significant difference between the availability of foods and the students consumption patterns
2. There is no significant difference between nutrition education and feeding information of the students.
3. There is no significant difference between students' feeding preference and nutrition education.
4. There is no significant difference between the frequency of consumption and nutrition education.

### **SIGNIFICANCE OF STUDY**

- This study is baseline information for other researchers who may be interested in studying this topic since this type of research has never been conducted in Ikot Okpora, Biase Local Government Area before.
- This work would also be useful to the local government authorities to pay attention on the nutrition and feeding of the school children.
- The work will also be beneficial for Community Health Officers/Home Economists to visit these areas and educate the citizens or the community.
- This research could also be beneficial for policy makers, the legislative, the state government to make policies that will encourage food production in order to ensure food security for all households in Nigeria.

### **RESEARCH METHODOLOGY**

#### **Research design**

The research design for this study was survey design. This was because this study was aimed at studying the situation as it is (Olaitan, 2004).

The study has to do with the effect of nutrition education and the feeding pattern of school (secondary) students in Ikot Okpora of Biase local government area of Cross River State. The location of this study is Ikot Okpora in Biase Local Government Area.

#### **Population of study**

The population of study was made up of all students in secondary schools of Ikot Okpora; Okoh Comprehensive High School with a total number of three hundred and twenty (320) students and twelve (12) teachers making a total of three hundred and forty six **(346) students**.

#### **Sample size**

The sampling size for this study is the entire population, since there is only one secondary school (320).

#### **Biase local government area has eleven wards namely:**

1. Akpet/abini ward
2. Erei North
3. Erei South
4. Agwugune/Okurike ward
5. Umon South
6. Umon North
7. Adion ward
8. Ehom ward
9. Ikun/Etono
10. Biakpan
11. Ijom/Abayoung

The area known today as Biase is divided into two by Cross River State. The major occupation of the people of Biase is farming, hunting and fishing. In the early days, Biase people were traditionalists who worshiped idols. They were not exposed to Christian religion early enough. Biase people became inclined to Christianity after some levels of exposure; this was made possible by the Scotland mission that came to enlighten the people on Christianity. The major languages in Biase are: Akpet, Umon, Erei and Agwugune. The major occupations of people in Biase include: yam farming, cassava cultivation, cocoyam, water-yam, plantain, maize, okra vegetables etc., cultivation and fishing. There are also hunters in all the communities of Biase. The people of Biase are very hardworking and industrious people. Biase people were exposed early enough to the modern day education, this resulted in the production of scholars at different levels of education such as doctors, architects, professors, etc. Just as languages differ in Biase

so did administration style differs. All villages in Biase have their clan heads, village clan heads, clans chiefs, etc. all these chiefs are subjected to the authority of the paramount ruler who is automatically head of the administration Biase Local Government Area.

#### **Instrument for data collection**

The instrument for data collection is a well-structured (likert scale) questionnaire. The questionnaire is divided into section A, B and C. The A section **will be asking** questions on the respondent personal data which include: sex, age, occupation, monthly earning, marital status and religion of parents of the students. Section B are questions for feeding information and section C questionnaire (food frequency) designed for the students to know the types of food consumed by them.

#### **Validation of the instrument**

The items in the questionnaire were drawn to reflect the hypothesis generated to the variables under study. Before using the instrument, the item developed was taken to experts in research and statistics for screening. Those found relevant were retained while the irrelevant items were dropped.

#### **Reliability of the instrument**

Reliability refers to the degree of the consistency that an instrument demonstrated in measuring what it does. To determine the instrument reliability, the researcher administered 40 questionnaires to 40 respondents that are not in the main study. After two weeks, the questionnaire was administered again to the same respondents. The responses of the first and second set were collated and Pearson Product Correlation was used to test the relationship between the two sets.

#### **Procedure for data collection**

The questionnaires were the main instrument used for data collection. The questionnaires were administered in school/parents/medical practitioners in Ikot Okpora. The respondents were informed of the exercise and the importance of giving objective responses to the items. They were also told to be honest and reminded that no answer is wrong or right. The researcher administered the questionnaires with the help of some teachers/parents. The questionnaires were collected immediately after completion.

#### **Data analysis**

To test the hypotheses generated for the study, the independent paired t-test were employed as shown below:

#### **Hypothesis one**

H<sub>0</sub>: There was no significant difference in the availability of food stuff in the community and food consumption patterns of secondary school students.

Independent Variable: Food availability

Dependent Variable: Consumption pattern

Data Analysis: Independent paired t-test

#### **Hypothesis two**

H<sub>0</sub>: There was no significant difference between nutrition education and feeding information of the students.

Independent Variable: Feeding information

Dependent Variable: Nutrition education

Data Analysis: Independent paired t-test

#### **Hypothesis three**

H<sub>0</sub>: There was no significant difference between nutrition education and consumption patterns of the students.

Independent Variable: Nutrition education

Dependent Variable: Consumption pattern

Data Analysis: Independent paired t-test

#### **Hypothesis four**

H<sub>0</sub>: There was no significant difference between frequency of consumption and nutrition.

Independent Variable: Frequency of consumption

Dependent Variable: Consumption pattern

Data Analysis: Independent paired t-test

#### **Area of study**

The area of study was Ikot Okpora in Biase Local Government Area, Cross River State, Nigeria. Biase is bounded by Yakurr Local Government Area in the north and Ebonyi and Abia state at the Northeast, Odukpani Local Government Area in the West. It is located along latitude 05°N 18' and 05°05' North and longitude 75°30' West 1816'. It is located in the Southern Senatorial District of Cross River State.

The headquarters is located at Akpet central. Biase has 11 political wards which include: Akpet/Abini ward, Erei North, Erei South, Agwugune/Okurike, Umon South, Umon North, Adion, Ehom, Ikun/Etono, Biakpan and Ijom/Abayoung. Biase has 34 clans and 567 villages (Cross River State Edi No. 1 of 1996). Biase has an estimated total population of

169,183 with male population 18,737 and female population of 76,446 (National Population Commission, 2006). Calabar, the post code of the area is 542. The main occupations of Biase people are farming, fishing, hunting and tapping of palm wine. Other occupations include trading, business and civil service jobs. Biase communities are blessed with a lot of human materials and natural resources which include gravel, sand shore, timber, palm wine, fish, yam, pepper, cassava, cocoyam and vegetables. Biase has many primary and secondary schools, health clinics, cottage hospitals, postal agencies, courts and market. The people of Biase have different languages commonly called Ubahara

and Egupipa. These people are deeply noted for their cultural heritage which differs in different communities and they have free interaction with one another in different communities in some communities like Okurike, Agwagune, Erei respectively display traditional wrestling, native dance like Obum dance, Ikpe Obin and Edia. Most communities in Biase celebrate new yam festival and this takes place between July to October. During the period there are lots of cultural displays depending on the custom/traditional stipulation of such commodity. Biase communities practice Christianity and traditional religion as few people still hold on their ancestral system of worship and belief.

**RESULTS AND DISCUSSION**

**Table 4.1**

**Demography socio-economic characteristics descriptive of parents**

| <b>Variable</b>       | <b>Frequency (n)</b> | <b>Percentage (%)</b> | <b>Mean + std. div.</b> | <b>SEM</b> |
|-----------------------|----------------------|-----------------------|-------------------------|------------|
| <b>Age (years)</b>    |                      |                       |                         |            |
| <= 19                 | 36                   | 36.0                  |                         |            |
| 21-29                 | 28                   | 28.0                  |                         |            |
| 39-49                 | 17                   | 17.0                  | 2.27 ± 1.278            | 0.128      |
| 50-59                 | 11                   | 11.0                  |                         |            |
| >= 60                 | 8                    | 8.0                   |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Gender</b>         |                      |                       |                         |            |
| Female                | 57                   | 57.0                  |                         |            |
| Male                  | 43                   | 43.0                  | 1.43 ± 0.498            | 0.050      |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Education</b>      |                      |                       |                         |            |
| No formal schooling   | 20                   | 20.0                  |                         |            |
| Primary school        | 30                   | 30.0                  |                         |            |
| Secondary             | 40                   | 40.0                  | 2.40 ± 0.921            | 0.092      |
| Tertiary              | 10                   | 10.0                  |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Income</b>         |                      |                       |                         |            |
| <= 15,000             | 55                   | 55.0                  |                         |            |
| 16-40,000             | 22                   | 22.0                  |                         |            |
| 41-70,000             | 14                   | 14.0                  | 177 ± 1.004             | 0.100      |
| >= 71,000             | 9                    | 9.0                   |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Expenditure</b>    |                      |                       |                         |            |
| <= 15,000             | 72                   | 72.0                  |                         |            |
| 16-40,000             | 11                   | 11.0                  | 1.54 ± 0.979            | 0.098      |
| 41-70,000             | 8                    | 8.0                   |                         |            |
| >= 71,000             | 9                    | 9.0                   |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Marital status</b> |                      |                       |                         |            |
| Single                | 10                   | 10.0                  |                         |            |
| Married               | 68                   | 68.0                  |                         |            |
| Separated             | 7                    | 7.0                   | 2.39 ± 1.109            | 0.111      |
| Divorced              | 3                    | 3.0                   |                         |            |
| Widowed               | 12                   | 12.0                  |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Occupation</b>     |                      |                       |                         |            |
| Farming               | 40                   | 40.0                  |                         |            |
| Trading               | 26                   | 26.0                  |                         |            |
| Civil servant         | 13                   | 13.0                  | 2.18 ± 1.226            | 0.123      |
| Student               | 18                   | 18.0                  |                         |            |
| Artisan               | 3                    | 3.0                   |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |
| <b>Religion</b>       |                      |                       |                         |            |
| Christianity          | 65                   | 65.0                  |                         |            |
| Islam                 | 8                    | 8.0                   | 1.72 ± 1.074            | 0.107      |
| Traditional           | 17                   | 17.0                  |                         |            |
| Others                | 10                   | 10.0                  |                         |            |
| Total                 | 100                  | 100.0                 |                         |            |

Table 4.1 showed the demographic and socio-economic characteristics of the parents. The table showed that majority of the parents 36 (36%) were aged 19 and above, indicating many of them were teenager parents 57% of them were females, while 43% were males. Majority (40%) of the parents had secondary school education while only 10% had tertiary education. Most of the parents (55%) are low income earners N15,000.00 per month while only 9% of them

earn less N71,000.00. Seventy one percent (72%) of the low income earners spent almost their income. Sixty-eight percent (68%) of them are married; ten percent (10%) are single. Majority of the parents (40%) are farmers and only thirteen percent (13%) are civil servants. Most of the parents (65%) are christens, while only eight percent (8%) are Moslem. Most of the parents 123 (38.4%) had 7 children and 102 (31.4%) had 5-6 children.

Table 4.2

## Demography descriptive of children/students

| Variable                         | Frequency (n) | Percentage (%) | Mean $\pm$ std. div. | SEM   |
|----------------------------------|---------------|----------------|----------------------|-------|
| <b>Age</b>                       |               |                |                      |       |
| 12-13                            | 116           | 36.3           |                      |       |
| 15-16                            | 120           | 37.5           | 1.90 $\pm$ 0.044     | 0.785 |
| 17-18                            | 84            | 26.3           |                      |       |
| Total                            | 320           | 100.0          |                      |       |
| <b>Sex</b>                       |               |                |                      |       |
| Female                           | 171           | 53.4           |                      |       |
| Male                             | 149           | 46.6           |                      |       |
| Total                            | 320           | 100.0          |                      |       |
| <b>Class</b>                     |               |                |                      |       |
| JSS 1                            | 60            | 18.8           |                      |       |
| JSS 2                            | 85            | 26.6           |                      |       |
| JSS 3                            | 68            | 21.3           | 3.02 $\pm$ 0.090     | 1.606 |
| SS 1                             | 45            | 14.1           |                      |       |
| SS 2                             | 21            | 6.6            |                      |       |
| SS 3                             | 41            | 12.8           |                      |       |
| Total                            | 320           | 100.0          |                      |       |
| <b>No. of children</b>           |               |                |                      |       |
| 1-2 children                     | 13            | 4.1            |                      |       |
| 3-4 children                     | 82            | 25.6           | 3.05 $\pm$ 0.050     | 0.896 |
| 5-6 children                     | 102           | 31.9           |                      |       |
| >= 7 children                    | 123           | 38.4           |                      |       |
| Total                            | 320           | 100.0          |                      |       |
| <b>Index child in the family</b> |               |                |                      |       |
| 1 <sup>st</sup> child            | 13            | 4.1            |                      |       |
| 2 <sup>nd</sup> child            | 44            | 13.8           |                      |       |
| 3 <sup>rd</sup> child            | 113           | 35.3           | 3.45 $\pm$ 0.060     | 1.079 |
| 4 <sup>th</sup> child            | 87            | 27.2           |                      |       |
| 5 <sup>th</sup> child            | 63            | 19.7           |                      |       |
| Total                            | 320           | 100.0          |                      |       |

Table 4.2 showed the demographic data of the students. Majority of the students 116 (36.3%) were between the ages of 12 and 13 years and 120 (37.5%) were between the ages of 15-16 years 171 (53.4%) of the students are females

and 149 (46.6%) are males. Majority 85(26.6%) were in junior secondary school 2 (JSS2). Majority of the students 113(35.3%) are index children in their family.

## Type of Foods

■ Garri and soup ■ Yam ■ Rice and stew ■ Jellof rice  
■ Fried plantain ■ Green plantain ■ Bread and tea ■ Akara  
■ Beans pottage ■ Beans and stew ■ Beans and rice ■ Agidi

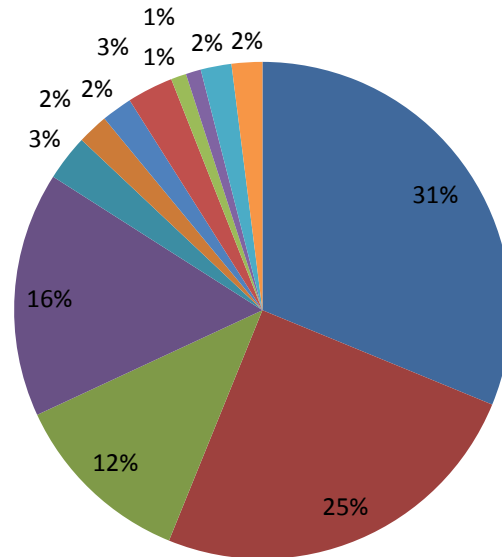


Fig 1: shows that majority of the students 100 (31.3%) preferred garri and soup and also 25%) preferred yam and yam products.

## Meals eaten in a day

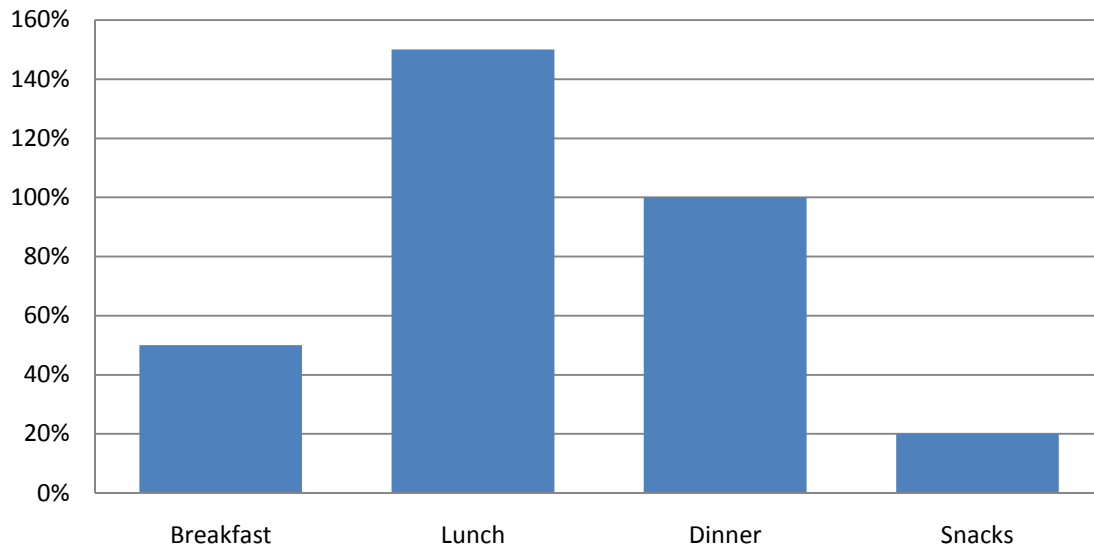


Fig. 2: showed that more students take mostly lunch 150 (46.88%) and dinner 100 (31.3%). Only 50 (15.63%) had their breakfast and 20 (6.25%) of the students had some form of snacks.

Table 4.3

### Do you skip any meal?

| Skipped meals | Frequency  | Percentage    |
|---------------|------------|---------------|
| Yes           | 250        | 78.13%        |
| No            | 70         | 21.88%        |
| <b>Total</b>  | <b>320</b> | <b>100.01</b> |

Table 4.3 showed that 250 (78.13%) of the students skipped meals, while 70 (21.88%) did not.

Table 4.4

### Meal skipped

| Skipped meals | Frequency  | Percentage |
|---------------|------------|------------|
| Breakfast     | 80         | 25%        |
| Lunch         | 80         | 25%        |
| Dinner        | 40         | 12.5%      |
| Snacks        | 120        | 37.5%      |
| <b>Total</b>  | <b>320</b> | <b>100</b> |

Table 4.4 showed that 120 (37.5%) did not have their snacks. Breakfast and lunch 80 (25%) were meals mostly skipped by the students.



Table 4.5

**Reasons for skipping meals**

| Reason                     | Frequency  | Percentage % |
|----------------------------|------------|--------------|
| Lack of food               | 150        | 46.88        |
| Food not properly prepared | 80         | 25           |
| Dinner                     | 40         | 9.38         |
| Snacks                     | 120        | 12.5         |
| <b>Total</b>               | <b>320</b> | <b>100</b>   |

Table 4.5 showed skipped meals because the food is not available 150 (46.88%) and 80 (25%) skipped because the food was not properly prepared.

Table 4.6

**Feeding information I**

| Feeding information         | Frequency  | Mean & std. deviation |
|-----------------------------|------------|-----------------------|
| <b>Breakfast</b>            |            |                       |
| plantain                    | 100 (31.3) |                       |
| Bread and tea               | 31 (27.7)  | 2.64 ± 1.26           |
| Fried plantain              | 72 (22.5)  |                       |
| Yam pottage                 | 117 (36.6) |                       |
| Total                       | 320 (100)  |                       |
| <b>Lunch</b>                |            |                       |
| Garri/okra soup             | 100 (31.3) |                       |
| Melon soup/ cassava fufu    | 119 (37.3) | 2.16 ± 1.04           |
| Afang soup/yam fufu         | 51 (15.9)  |                       |
| Vegetable soup/cassava fufu | 50 (15.6)  |                       |
| Total                       | 320 (100)  |                       |
| <b>Dinner</b>               |            |                       |
| Stew/rice                   | 70 (21.9)  |                       |
| Cocoyam pottage             | 179 (55.9) | 2.07 ± 0.80           |
| Ekpankukwo                  | 50 (15.6)  |                       |
| Mushroom soup/garri         | 21 (6.6)   |                       |
| Total                       | 320 (100)  |                       |
| <b>Snacks</b>               |            |                       |
| Biscuits/zobo drink         | 93 (29.1)  |                       |
| Chin chin                   | 87 (27.2)  | 2.45 ± 1.20           |
| Tapioca/coconut             | 43 (13.4)  |                       |
| Palm kernelnut/tapioca      | 97 (30.3)  |                       |
| Total                       | 320 (100)  |                       |

Table 4.6 showed that the types of food eaten by the students in their locality or community (Ikot Okpora). The table showed that for Breakfast yam pottage 117 (36.6%) most consumed. Melon soup with cassava fufu 119 (37.2%) for lunch and

cocoyam pottage 79 (55.9%) for dinner followed by fish stew with rice 70 (21.9%) majority of the students took palm kernel with tapioca (30.3) for snack.

Table 4.7

### Comparison of the student's consumption of food pattern before and after nutrition education

Paired samples t-test of students' consumption of food pattern before and after nutrition education

| Food pattern                 | Mean  | Standard deviation | Frequency (n) | t     | df  | p-value (sig.) |
|------------------------------|-------|--------------------|---------------|-------|-----|----------------|
| <b>Starchy fruit</b>         |       |                    |               |       |     |                |
| Before                       | 7.06  | 2.23               | 320           | 26.12 | 319 | 0.00**         |
| After                        | 5.68  | 2.02               |               |       |     |                |
| <b>Root and tubers</b>       |       |                    |               |       |     |                |
| Before                       | 24.21 | 8.63               | 320           | 8.79  | 319 | 0.00**         |
| After                        | 23.01 | 7.84               |               |       |     |                |
| <b>Pastas</b>                |       |                    |               |       |     |                |
| Before                       | 8.84  | 3.48               | 320           | 52.68 | 319 | 0.00**         |
| After                        | 10.86 | 3.62               |               |       |     |                |
| <b>Meat and fish</b>         |       |                    |               |       |     |                |
| Before                       | 37.90 | 11.29              | 320           | 23.28 | 319 | 0.00**         |
| After                        | 39.40 | 10.89              |               |       |     |                |
| <b>Legumes</b>               |       |                    |               |       |     |                |
| Before                       | 25.40 | 9.16               | 320           | 11.63 | 319 | 0.00**         |
| After                        | 27.13 | 8.80               |               |       |     |                |
| <b>Green leaf vegetables</b> |       |                    |               |       |     |                |
| Before                       | 21.50 | 8.13               | 320           | 13.92 | 319 | 0.00**         |
| After                        | 22.40 | 8.51               |               |       |     |                |
| <b>Fruits</b>                |       |                    |               |       |     |                |
| Before                       | 34.90 | 11.90              | 320           | 42.15 | 319 | 0.00**         |
| After                        | 37.60 | 11.38              |               |       |     |                |
| <b>Fat and oil</b>           |       |                    |               |       |     |                |
| Before                       | 18.20 | 5.29               | 320           | 54.24 | 319 | 0.00**         |
| After                        | 15.62 | 4.65               |               |       |     |                |
| <b>Dairy products</b>        |       |                    |               |       |     |                |
| Before                       | 9.93  | 3.56               | 320           | 54.24 | 319 | 0.00**         |
| After                        | 14.1  | 4.63               |               |       |     |                |
| <b>Confectionaries</b>       |       |                    |               |       |     |                |
| Before                       | 5.71  | 2.03               | 320           | 45.42 | 319 | 0.00**         |
| After                        | 8.00  | 2.40               |               |       |     |                |
| <b>Cereals</b>               |       |                    |               |       |     |                |
| Before                       | 9.56  | 3.57               | 320           | 19.35 | 319 | 0.00**         |
| After                        | 8.66  | 3.29               |               |       |     |                |
| <b>Baked products</b>        |       |                    |               |       |     |                |
| Before                       | 17.20 | 4.86               | 320           | 27.88 | 319 | 0.00**         |
| After                        | 19.40 | 5.16               |               |       |     |                |

\*\* indicates the significant different at p-value  $\leq 0.05$  (5%)

Table 4.7 showed that there was a significant difference between the patterns of consumption for the students for starchy fruits using paired sample t-test. The mean for before and after were 7.06 and 5.68 and standard deviation 2.23 and 2.02 respectively. There was also a

significant difference in the mean values 24.21 and 23.01 in consumption of root and tubers deviation of 8.63 and 7.84 for before and after nutrition education.

The mean values of consumption for pastas for before and after nutrition education were 8.84

and 10.86 with standard deviation of 3.48 and 3.62 reach, showing a significant difference in the consumption pattern. The means of after and before nutrition education for meat and fish were 37.9 and 39.4 and standard deviation 11.29 and 10.89 respectively, indicating a significant difference. Legumes mean values for before 25.4 and after 27.13 and standard deviation 9.16 and 8.80 each, showing a significant increase.

The consumption for green leafy vegetables increased significantly with mean values for before 21.5 and after 22.4 and standard deviation 8.13 and 8.51 respectively. The fruits increased significantly with mean values for before 34.9 and after 37.6 each and standard deviation of 11.9 and 11.38 each. The meal vales for the consumption of fat and oil reduced from 18.20 to 15.62 for before and after nutrition education and standard deviation of 5.29 and 4.65 respectively showing significant reduction.

The consumption for dairy products increased with mean values 9.93 and 14.1 each and standard deviation 3.56 and 4.63 respectively, indicating a significant reduction. The mean values of consumption of confectionaries 5.71 and 8.00 for before and after increased significantly with standard deviation 2.03 and 2.40 each. The consumption of cereals for before and after reduced significantly with mean values of 9.56 and 8.66 each for before and after nutrition education and standard deviation of 3.57 and 3.29 respectively. The consumption of baked produced increased significantly with mean values 17.2 and 19.4 each and standard deviation of 4.86 and 5.16 respectively.

### **Discussion**

There was significant increase in the consumption of some food items like vegetables, meat and fish, legumes, green vegetables, fruits, dairy products, and baked products and a significant reduction in the consumption of carbohydrate foods such as starchy fruits, roots and tubers, cereals indicating that nutrition education had a significant effect on the consumption pattern of the students.

The increase in the consumption of food items like dairy products, vegetables, legumes, if sustained would have great impact on the health of the students. This means their health and academic performance would also improve. This would also lead to reduction in mortality rate of children in the community and in Nigeria.

The reduction in consumption of carbohydrates products such as starchy roots and tubers, starchy fruits, cereals would reduce

protein energy malnutrition kwashiorkor, marasmus, anemia, and micro-nutrient deficiency diseases among this age group. This has implication in the quality of adults in the nation. Majority of the parents (36%) being teenage parents were low income earners and secondary school certificate holders would have effect on the healthcare and education of the students.

### **SUMMARY, RECOMMENDATION AND CONCLUSION**

#### **Summary**

This research on effect of nutrition education on the consumption pattern of secondary school students in Ikot Okpora in Biase Local Government Area of Cross River State was aimed to investigate the types of food available in Ikot Okpora, to determine food frequency of consumption. Survey design and purposive sample was used to select three hundred and twenty students of the school since the number was small and one hundred (100) parents. Descriptive statistics percentages and independent paired sample t-test was used to separate and compare means.

The result of the study showed that majority of the parents were teenagers (36%) who were mostly farmers and traders (40/26%) respectively and who are majorly low income earners (N15,000.00) per month. This would have effect on health of the students. A significant increase in some food items such as dairy products, vegetables, legumes, meat and fish product, pastas, baked products after and a reduction of consumption in food items of carbohydrates such as starchy roots and tubers, cereals, sweets/sugars would have effect on the health of the students. This implied that nutrition education had effect on the consumption pattern of the secondary school students.

#### **RECOMMENDATIONS AND CONCLUSION**

Nutrition education should be intensified both in schools and community. Schools feeding programme should be implemented in the state/federal schools, so as to encourage the students to eat variety of meals.

From the findings of the research, nutrition education had effect in reducing the amount of carbohydrates and increasing the consumption of protein foods among the going students.

The increase in baked products and pasts consumption could be allowed to enable the students take some snacks while in school during brake time, while increase in the consumption of fat and oil (margarine) should be encouraged as

most margarine are fortified with some micro-nutrients. The excessive consumption of sweets and sugars should be discouraged as this would lead to dental carries especially in children with chronic diseases like obesity, diabetes, etc.

### CONTRIBUTION TO KNOWLEDGE

This research has shown the inadequacy of diet of the rural children/students. This type of diet is the cause of many micro-nutrient deficiency diseases and increase in rate of stunting and wasting among young children. Therefore most rural communities must educate people on what types of food their children should consume to maintain good health.

### REFERENCES

- Beaufoy G. 2000. The environment impact of live oil production in the European Union: practical options for improving the environment impact. Brussels, Environment Directorate-General, European Commission, 2000.
- Bruinma J., ed. 2003. World agriculture: towards 2015/2030. An FAO perspective. Rome, food and agriculture organization of United Nations/London, Earthscan, 2003.
- Drewnowski A, Popkin B. M. 1997. The nutrition transition: new trends in the global diet. *Nutrition reviews*, 1997, 55:31-43.
- Fats and oils in human nutrition. Report of a joint expert consultation. Rome food and agriculture organization of United Nations, 1994 (FAO, food and nutrition paper, No. 57).
- Ferro-Luzzi A, Martino L. 1996 obesity and physical activity: Ciba foundation symposium, 1996, 201: 207-221.
- Fresco L. O., Baudoin W. O., 2002. Food and nutrition security towards human security. In: proceeding of the international conference on vegetable, (ICV-2002), 11-14 November, Bangalore, India. Bangalore, Dr. Prem Nath Agricultural Science Foundation (in press).
- Golpaldas, T. *et al* 1968. Development of indigenous for the preschool child, New Delhi, care, India.
- Guo X *et al*. structure changes in the impact of income on food consumption in China 1989-1993. *Economic development and culture change*, 2000. 48: 737-760.
- India Nutrition Profile 1998. New Delhi, Department of Women and Child Development, Ministry of Human Resource Development, Government of India, 1998.
- Jellifles, D. H., 1968. Infant nutrition in the subtropics and tropics Geneva World Health Organization, monograph series, No. 29, pp. 271-252.
- Popkin BM. 2001. Nutrition in transition: the change global nutrition challenge. *Asia Pacific Journal of Clinical Nutrition*, 2001, 10 (suppl. 1): S13-S18.
- World Agriculture: Towards 2015/2030. Summary Report. Rome, food and agriculture organization of the United Nations/London: Earthscan, 2002.