

## FRUIT AND VEGETABLE CONSUMPTION AMONG STUDENTS OF TERTIARY INSTITUTIONS IN OYO STATE

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### ABSTRACT

Studies have shown that adequate consumption of fruits and vegetables is vital to sound health. Eating vegetables and fruits appears to keep the brain young and prevent mental decline due to ageing. In Nigeria, many studies on fruit and vegetable consumption concentrated on adult population but empirical study on fruit and vegetable consumption pattern of students has rarely been considered. The study was therefore carried out to assess fruit and vegetable consumption among students of tertiary institutions in Oyo state, Nigeria. Two hundred well-structured questionnaires were administered to students through a multi-stage sampling technique. Data were analyzed using descriptive statistics and multiple regressions. The result revealed that the most preferred fruit by students was banana (34%) while the least preferred was cashew (1%). The most preferred vegetable was pumpkin leaves (32%) while the least preferred was celosia (20%). Only 37% of the students consumed the recommended fruit and vegetable intake. Regression analysis showed that student income, sex, parent's income and Availability of fruit were statistically significant and determined fruit consumption among student ( $p < 0.01$ ,  $p < 0.05$ ,  $p < 0.10$ ). The study recommended creation of awareness on the importance of fruit and vegetable consumption among students.

### KEY WORDS

Fruit; Vegetable; Preference; Consumption; Awareness; Students; Availability.

Fruits and vegetables are an important component of healthy human diet. They are good sources of vitamins and minerals, vegetable proteins, protective micronutrients and dietary fibres which help to prevent constipation (WHO, 2003, Lock *et al*, 2004 and Balasubramanian, 2012). They are foods with low energy density, i.e. with few calories in relation to the volume of the food consumed, which favors maintenance of healthy body weight (USDA, 2009). Regular consumption of adequate amounts of fruit could prevent major diseases such as cardiovascular diseases and some cancers (Pomerleau *et al*, 2004). Eating vegetables appears to help keep the brain young and may slow the mental decline sometimes associated with growing old (Morris *et al*, 2006). A diet including mainly spinach can boost memory power and help in cognition and better learning (Vishal, 2014).

In spite of the enormous benefits of fruits and vegetables, studies have shown that consumption of fruits and vegetables in Africa is low compared to the recommended daily intake (Hall *et al*, 2009). Estimates of fruit and vegetables in sub-Saharan Africa ranges from 70 to 312 g per person per day, far below the WHO/FAO minimum recommendation of 400g per person per day or 146kg per person per year (Ruel *et al*, 2004). Facts from WHO information sheet showed approximately 2.7 million of deaths and 1.8% of global disease burden worldwide are attributable to low fruit and vegetable consumption and insufficient intake of fruit and vegetables is estimated to cause around 14% of gastrointestinal cancer deaths, about 31% of heart disease and about 11% of stroke deaths (WHO, 2003).

Past studies on fruit and vegetable consumption in Nigeria (such as Ibrahim, 2011, Banwat *et al*, 2012, Williams *et al*, 2009 e.t.c) has been among the adult populace. Ibrahim, 2011, investigated fruit response efficacy and fruit consumption among a group of civil servants of Oyo state, Banwat *et al*, 2012, considered the knowledge and intake of fruit and vegetable consumption among adults in an urban community in North Central Nigeria and Williams *et al*, 2009, focused on vegetable consumption patterns among pregnant women. However, limited information seems to exist on fruit and vegetable consumption among students in Nigeria. Hence, this study was carried out to assess fruit and vegetable

consumption among Students of Tertiary Institutions in Oyo State. The specific objectives are to: describe the socio-economic characteristics of the students; identify the most preferred fruits and vegetables by students; determine the factors affecting fruit and vegetable consumption among students.

## METHODOLOGY

*Description of study area.* Oyo state is one of the thirty-six states in Nigeria. It covers an area of about 28,454 square kilometers (10,986 sq mi) and has a population of 5,591,589 as at 2006 census (Wikipedia, 2012). Oyo state is in latitude  $6^{\circ}55' - 8^{\circ}00' N$  and longitude  $2.5^{\circ}E - 4^{\circ}00'E$  in south-western Nigeria. The mean annual rainfall ranges from 100mm to 1500mm and average daily temperature ranges between  $25^{\circ} C$  and  $35^{\circ} C$ . The state is bounded in the north by Kwara, in the south by Ogun, in the east by Osun state and in the west partly by Ogun and partly by Republic of Benin.

*Sampling technique.* A multistage sampling technique was used in the choice of individual respondents. The first stage was the purposive selection of Oyo state. The state was selected because it has many tertiary institutions and the first university in the country is located in Ibadan, the capital city of the state. The second stage was the selection of two cities (Ibadan and Oyo). The third stage was the selection of four tertiary institutions of learning across the selected cities. University of Ibadan, Ibadan, The Polytechnics, Ibadan, Federal College of Education (special), Oyo, and Federal School of Surveying, Oyo, were finally selected for the study. The last stage was the random selection of fifty students in each of the selected institutions from the faculties of agriculture, human nutrition and science. A total of two hundred (200) pieces of questionnaire were therefore administered for the collection of the data used for the study.

*Method of data collection.* Primary data was used in this study. A pre-tested well-structured questionnaire was used to collect detailed information on student's fruit and vegetable consumption pattern using seven days memory recall. Data were collected on socio-economic characteristics (gender, age, religion, parents' income and student monthly allowance), fruit and vegetable of preference and factors affecting fruit and vegetable consumption.

*Method of data analysis.* Descriptive statistics was used for determining the socio-economic characteristics of respondents, preference for fruits and vegetables consumption while multiple regression analysis was used to determine factors affecting fruits and vegetables consumption.

*Model specification.* Linear regression model was used to determine the factors affecting fruit and vegetables consumption. The implicit form was given as:

$$C = f(X_1, X_2, X_3, X_4, X_5, X_6, \mu) \quad (1),$$

while the explicit form was given as:

$$C = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu \quad (2),$$

where, C = Amount spent on fruits and vegetables (₦);  $X_1$  = Sex;  $X_2$  = Religion;  $X_3$  = Parent income (₦);  $X_4$  = Students' allowance (₦);  $X_5$  = Dummy variable for taste (If taste determines student choice 1, otherwise 0);  $X_6$  = Dummy variable for availability of fruits and vegetables (If availability determines student choice 1, otherwise 0);  $\mu$  = Disturbance term;  $\beta_0$  = Constant term;  $\beta_1 - \beta_6$  = Coefficients of independent variables.

## RESULTS AND DISCUSSION

*Socio-economic characteristics of the respondents.* The results of the analysis revealed that majority of the respondents were male (55%) and their average age was 21 years,

indicating that most of the respondents were young. The range of most of the students monthly allowance was between ₦1000 and ₦ 5000 (41.50%), but, the average student allowance was ₦9015.98 per month. The average amount spent on food monthly was ₦6049.05, out of which ₦436.03 was spent on fruits and vegetables monthly (table 1). This indicates that the percentage of the total and food budget share spent on fruits and vegetables were 4.84% and 7.21% respectively, which is very low. This is in line with the findings of Ruel *et al* (2004) who reported that the share of total and food budget allocated to fruit and vegetables among individuals in sub-saharan African ranges from 3-13% and 4.5-16% respectively. The percentage of student's income that is spent on food and other commodities will in turn determine the amount spent on fruit and vegetable consumption (Adenegan and Adeoye, 2011).

Table 1 – Socio-economic characteristics of the respondents

Variables	Frequency	Percent	Mean
Sex	-	-	-
Male	110	55.00	
Female	90	45.00	
Age (year)			21.4 years
15-19	54	27.00	
20-24	104	52.00	
25-29	26	13.00	
30-34	16	8.00	
Student allowance ( ₦ )	-	-	₦9015.98
1000-5000	83	41.50	
5001-10000	63	31.50	
10001-15000	22	11.00	
15001-20000	13	6.50	
20001-25000	5	2.50	
25001-30000	2	1.00	
No response	12	6.00	
Amount spent on food monthly ( ₦ )	-	-	₦6049.05
1-1000	5	2.50	
1001-5000	87	43.50	
5001-10000	62	31.00	
Above 10000	25	12.50	
No response	21	10.50	
Amount spent on Fruits & vegetables monthly ( ₦ )	-	-	₦ 436.03
<100	27	13.50	
101-200	44	22.00	
201 -300	33	16.50	
301-400	28	14.00	
401-500	20	10.00	
>500	57	25.50	

Source: Field survey 2012. ₦ = Naira (Nigerian currency); ₦1=\$US0.006 as at the time of carrying out this study.

**Preference for fruits and vegetables by the students.** Consumer preference influences decisions of consumers regarding what they choose to purchase or consume. The most preferred fruit by students was banana (34%), followed by water melon (27%) and the least preferred were pawpaw (2%) and cashew (1%). The most preferred leafy vegetable by students was pumpkin leaves (32%) while celosia was least preferred (20%) (Table 2). Health benefits (86.5%), taste (79%) and availability of fruits and vegetables (75.5%) were the reasons given by the students for their preference for fruits and vegetables (table 3). This is in line with the findings of Hart *et al*, 2005 who reported that availability, taste, and nutritional knowledge influence consumption of vegetable.

It was realized that only 37% of the respondents consumed the recommended fruit intake by World Health Organisation/Food and Agricultural Organisation (Fig. 1). WHO/FAO recommended a daily fruit and vegetable intakes of 400g (equivalent of five different types of fruits and vegetables per day). This indicated that majority (63%) of students in the study

area consumed less than recommended quantity, as this is a reflection of what is obtained in sub-saharan Africa. A similar finding was recorded by Ruel *et al* (2004) who reported as low as 40% fruit and vegetable consumption in developing countries. Mintah *et al*, 2012 also reported inadequate fruit consumption among students in Ghana.

Table 2 – Order of Preference of fruits and vegetable by the students (N=200)

Fruit	Percent	Rank	Vegetable	Percent	Rank
Banana	34.00	1 <sup>st</sup>	Pumpkin leaves	32.00	1 <sup>st</sup>
water melon	27.00	2 <sup>nd</sup>	Jute mellow	25.50	2 <sup>nd</sup>
Citrus (sweet orange)	13.00	3 <sup>rd</sup>	African spinach	22.50	3 <sup>rd</sup>
Pineapple	12.00	4 <sup>th</sup>	Celosia	22.50	4 <sup>th</sup>
Mango	6.50	5 <sup>th</sup>			
Plantain	4.50	6 <sup>th</sup>			
Pawpaw	2.00	7 <sup>th</sup>			
Cashew	1.00	8 <sup>th</sup>			
Total	100.00			100.00	

Table 3 – Reasons for preference of fruits and vegetable by the students (N=200)

	Yes	No	No response
Health benefits	173(86.50)	4(2.00)	23(11.50)
Taste	158(79.00)	14(7.00)	28(14.00)
Availability	151(75.50)	21(10.50)	28(14.00)

Note: Figures in parenthesis are percentages.

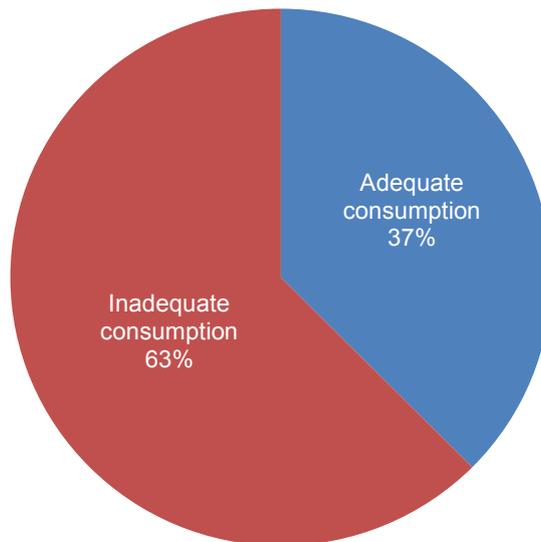


Figure1 – Status of fruit and vegetable consumption by the respondents

*Factors affecting fruit and vegetable consumption among students of tertiary institutions.* A linear regression was used to determine the factors affecting fruits and vegetable consumption among students. The result showed that coefficient of determination ( $R^2$ ) was 0.180 which implied that the independent variables accounted for 18% of total variation in dependent variable. F-value was 4.605; this implies that the model was significant at 1%  $\alpha$ -level and the independent variables have composite effect on the dependent variable (Table 4).

The linear model is given as:

$$C=93.750+225.146X_1^{**}-64.361X_2+66.171X_3^{**}+0.016X_4^*+49.467X_5-99.773X_6^{***}+\mu \quad (3)$$

In the model, four factors were statistically significant while two were insignificant to determine fruit and vegetable consumption among students. Student allowance (income) was positively significant at 10%, this implies that increase in student's allowance by ₦1 will lead to increase in fruit and vegetable consumption by ₦0.16. This agrees with the findings of Adenegan and Adeoye, (2011). They also reported that increase in students' allowances increases the amount the students spend on fruits vegetables. Therefore, the amount of money that individual spends on any particular good or service is mainly determined by disposable income (Adebayo, 1999). Sex was positively significant at 5%, this implies that student's sex influences their fruits and vegetables consumption. Male consumed more than the female. Also parent income was also positively significant at 5%, implies that increase in parent's income will increase student's fruits and vegetable consumption. Availability of fruits and vegetables was statistically significant at 1% to determine fruits and vegetables consumption among respondents. Availability and access to most of fruits and vegetables depends on their seasons and this determines the quantity and variety of fruit and vegetables available to students. Many of these fruits and vegetables are not available all the year round, especially, in Africa where technologies to extend harvest period or facilitate storage are limited. This result was supported by previous findings on importance of availability and seasonality of fruits and vegetables to their consumption (Othman *et al*, 2012 and Mette *et al* 2006). Taste was not statistically significant and did not determine the amount spent on consumption of fruits and vegetables.

Table 4 – Estimates of factors affecting consumption of fruits and vegetables among students

Independent Variables		B	Stand. Error	T-value	P-value	Remark
	Constant	93.750	277.307	0.338	0.736	
Sex	X1	225.146	90.313	2.493**	0.014	Sig
Religion	X2	-64.361	103.574	-0.621	0.535	NS
Parent income	X3	66.171	29.444	2.247**	0.026	Sig
Student income	X4	0.016	0.009	1.683*	0.095	Sig
Taste	X5	49.467	42.467	1.165	0.246	NS
Availability	X6	-99.733	35.965	-2.773***	0.006	Sig

\*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%, NS-Not significant

## CONCLUSION AND RECOMMENDATIONS

This study assessed fruit and vegetable consumption among students of tertiary institutions in Oyo state. It was indicated that students consumed less than the recommended quantity of fruit and vegetable by World Health Organisation/ Food and Agricultural Organisation. Fruit and vegetable have a budget share of 4.84% and 7.21% in total budget and food budget respectively. Banana (34%) ranked the highest while cashew (1%) was the least among the fruits consumed by students. Pumpkin leaves (32%) ranked the highest vegetable while celosia (22.50%) was the least vegetables consumed by students. The result of regression revealed that student's income, parent's income, sex and availability were significant determinants of fruit and vegetable consumption among students. Based on the findings of this study, there is need to create and promote awareness on the importance of adequate fruits and vegetables consumption among students in tertiary institutions in order to improve their health and prevent diseases. Since availability affect fruit and vegetable consumption, fruits and vegetables should be made available to students.

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