FRUIT AND VEGETABLE CONSUMPTION AMONG PRIMARY SCHOOL PUPILS OF EGBEDA LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT

The study assessed fruit and vegetable consumed, frequency of consumption and factors influencing consumption, among primary school pupils in Egbeda Local Government Area, Oyo State, Nigeria. A multi stage sampling technique was adopted to select and interviewed 260 respondents. Descriptive statistics, correlation analysis and T-test were used for data analyses. Result showed that the mostly consumed vegetables among others were tomatoes (96.5%), onion (94.2%), carrot (92.7%), okro (88.1%), and bitter leaf (80.4%) while mango (97.7%), banana (96.2%), pineapple (93.8%), pawpaw (91.9%), apple (87.7%), African star apple (88.5%), and coconut (83.8%) were mostly consumed fruits. Public primary school pupils consumed vegetables such as tomato, onion, red pepper, jute leaf and carrot above three times/week more than private primary school pupils. Public school pupils consumed fruits such as apple, orange, mango, banana, African star apple and watermelon above three times/week less than their private school counterparts. Serving of vegetables and fruit at home, siblings like for vegetables and fruit, likes for the taste of vegetables and fruit and likes for home-made stew and for fruit juice were factors influencing consumption of vegetables and fruits among the school pupils. There was a significant relationship between factors affecting consumption (r=0.179, p=0.004) and their frequency of fruit consumption. There was also a significant difference (t =2.459) in frequency of fruit consumption among public and private primary school pupils. School integrated nutrition education programs and parental awareness is needed to ensure frequent consumption of fruit and vegetable among school pupils.

Keywords: ***fruit, vegetable, school-age pupils, frequency, consumption.***

INTRODUCTION

Good nutrition during childhood and adolescence plays a key role in ensuring adequate growth and development, preventing the long-term risk of obesity and other chronic disease, and enhancing overall health and well-being **(**Ishdorj, Jensen, & Crepinsek, 2013). Since food habits are still developing during childhood and adolescence, it is important to help young people adopt healthy eating behaviours in order to improve longer term health outcomes (Berti & Agostoni, 2017). There is an increasing awareness that children's eating behaviours are influenced by environmental factors as well (Scaglioni, De Cosmi, Ciappolino, Parazzini, Brambilla, & Agostoni, 2018).). In addition to the home environment and parental influence, the school environment is recognized as contributing to the eating habits of children **(**Ishdorj, et al., 2013).

The preschool and school age years are the best time for children to start healthful living pattern of eating, focusing on regular activity and nutritious food. However, Children are at risk of varieties of micronutrient deficiencies and sufficient amount of calories and protein especially omega 3 fatty acids; calcium iron zinc, iodine, vitamin B 12 and vitamin D are required for normal growth (Zakharova, Sugyan & Dmitrieva, 2014; Harika et al, 2017).

In response to the child dietary requirement, Fruit and vegetables play a vital role in providing children with essential nutrients for healthy growth and development. The vast variety of essential vitamins and minerals provided by consuming a range of fruits and vegetables ensure optimal functioning of a child's body (Balasubramanian, Kalne, & Khan, 2019). Not only do a mixture of different fruits and vegetables supply the body with key nutrients but also assist in the prevention and resistance against disease. Thus, fruits and vegetables are an important component of healthy children diet. (Balasubramanian & Ragunathan, 2012; Bvenura & Sivakumar, 2017). Fruits and vegetables are foods with low energy density, i.e. with few calories in relation to the volume of the food consumed, which favours maintenance of healthy body weight (Layade & Adeoye, 2014). Nutrients provide our bodies with the essentials for healthy growth, maintenance and repair. A healthy diet is therefore crucial, as our bodies are unable to manufacture these key nutrients itself, consequently relying purely on our dietary intake to supply these fundamental nutrient (Kosendiak, Stanikowski, Domagała, & Gustaw, 2020)

OBJECTIVES OF THE STUDY

The general objective is to assess fruit and vegetable consumption among primary school pupils in selected primary schools.

Specific objectives:

The objectives of this research are to:

i. identify common fruits and vegetables consumed among primary school pupils in the study area;
ii. determine rate of consumption of fruit and vegetable per week among primary school pupils in selected public and private primary schools; and
iii. identify factors influencing fruit and vegetable consumption among primary school pupils in selected primary schools.

HYPOTHESES

i. There is no significant relationship between rate of fruit and vegetable consumption and identified factors influencing consumption
ii. There is no significant difference between rate of fruit and vegetable consumption among public and private school pupils

SIGNIFICANCE OF THE STUDY

In 2013, the WHO estimated that approximately 5.2 million deaths worldwide are attributable to low fruit and vegetable consumption. However, several studies have shown that children's intake of fruit and vegetable tracks into adolescence and the food preferences and eating habits

established in childhood and adolescence tend to be maintained into adulthood (Mikkila, Rasanen, Raitakari, Pietinen & Viikari, 2004). Since children's consumption behaviours are easily and permanently influenced by different social factors, in order to be able to adjust the consumption level of the whole society, it is wise and basic step to be able to determine the influencing factors. Thus, this study tends to bring an exposition on the consumption of fruit in children and young adolescents within the study area. Thus, laying a foundation in the process of combating nutritional deficiencies associated to micro-nutrient inadequacy as a way to reduce infant mortality in Nigeria. Further studies can be established to identify ways in which micro-nutrient consumption can be improved by creating an alternative for fruit and vegetables.

METHODOLOGY

Study location

This study was conducted in two private and public primary schools in Egbeda local government area of Oyo-state Ibadan. Ibadan is a city located in south-west Nigeria, 128km inland northeast of Lagos and 530km south west of Abuja (The federal capital), and is a prominent transit point between the coastal region and the areas to the north. Having a population of about 3.2 million (2011 census), Ibadan is located in the south eastern part of Oyo-state, about 120km east of the border with the republic of Benin. Egbeda is a Local Government Area in Oyo State, Nigeria. Its headquarters are in the town of Egbeda. It has an area of 191 km² and a population of 281,573 at the 2006 census. It consist of 4 wards namely Erunmu, Ayede, Owo bale/kasumu, Olodan/Ajiwogbo, Olodo/kumapayi I, Olodo II, Olodo III, Osegere/Awaye, Egbeda, Olode/Alakia and Olubadan estate. There are about 195 settlements in the LGA while over 60% of these settlements are rural in nature

Study design

A descriptive research design was employed for this study.

Study population

The study was conducted among public and private primary schools pupils which consist of children and young adolescents between age 6-16years.

Sample size determination

The kish-leslie formula was used to determine the required sample size using this equation.

$$N = \frac{Z^3pq}{D^2}$$

Where:

N= required sample size

Z= 1.96 (critical value of the standard normal distribution at the level of significance ɜ=0.05 (5%)

P= 0.214 prevalence of consumption of fruits and vegetables among children (Olga, 2007)

Q= (1-p)

D= maximum acceptable difference from true population, usually set at 0.05

Using the equation above

$$N = \frac{1.96*1.96*0.214(1-0.214)}{0.05*0.05} = 260$$

A total of 260 respondents from the study area were employed as the sample size for this study.

Sampling technique

A multi stage sampling technique was adopted in the selection of respondents. From the eleven wards in the Local Government Area, five wards were randomly selected which are Erunmu, Olodan/Ajiwogbo, Olodo III, Egbeda and Olode/Alakia. One private and one public school was randomly selected from each the selected wards, making a total of 10 schools. Among the schools, A total of 26 pupils each were randomly selected across different classes from each school according to their proportion to make a total of 260.

Data collection and materials

A well-structured interview schedule was used to collect information from the respondents. Question was asked on the socio-economic characteristics, common fruits and vegetables consumed and their rate of consumption on a weekly basis.Available models of fruit and vegetables were used for proper identification by the pupils. Factors affecting consumption of fruit and vegetable which were identified from existing literatures was assessed using series of questions.

Method of data analysis

Data was analysed using the Statistical Package for Social Sciences (SPSS) version 22.0. The data was collected on both qualitative and quantitative variables. Thus a descriptive statistic was used to describe the data, some of which includes mean, frequency distribution and cross-tabs was used to describe data collected while T-test and Correlation analysis will be used to test for the hypotheses.

RESULTS

Table I: **Socio-Economic Characteristics of Respondent**

Characteristics	Public school n=130		Private school n=130	
	Frequency	Percentage	Frequency	Percentage
Age				
7-10	33	25.4	114	87.7
11-14	90	69.2	16	12.3
15 and Above	7	5.5	0	0
Sex				
Male	57	43.8	67	51.5
Female	73	56.1	63	48.5
Religion				
Christianity	69	53.0	102	78.5
Islam	61	46.9	28	21.5
Class				
4	0	0.77	92	70.8
5	76	58.5	38	29.2
6	53	40.8	0	0
Pocket allowance (₦)				
≤ 25	16	12.3	61	46.9
26-50	66	50.8	57	43.8
51-100	45	34.6	12	9.23

101-150	1	0.76	0	0
151-200	2	1.54	0	0
Family size				
≤ 4	12	9.23	28	21.5
5-9	82	63.1	102	78.5
10-15	31	23.8	0	0
16 and Above	5	3.84	0	0
Ethnicity				
Yoruba	120	92.3	110	84.6
Igbo	5	3.84	14	10.8
Hausa	4	3.07	4	3.07
Others	1	0.76	2	1.53
Mothers occupation				
Civil servant	22	16.9	39	30
Artisan	22	16.9	21	16.2
Trader	86	66.1	70	53.8
Fathers occupation				
Civil servant	41	31.5	73	56.1
Artisan	45	34.6	31	23.9
Trader	44	33.8	26	20

Table I shows that, most (69.2%) of the respondent in public primary schools are within the age range 1-14, while Majority(87.7%) of the respondents in private primary schools are within the age range 7-10. Also, more than half (56.1%) of the respondents in public primary schools are Females while more than half (51.5%) of the respondents in private primary schools are males. The table also shows that half of the respondents (50.8%) in public primary schools receive pocket money within 26-50 naira as their pocket money. On family size, most (63.1%) of the respondent in public primary schools have between 5-9 family members while Majority (78.5%) of the respondents in private primary schools also have between 5-9 family members. Majority of the respondents in both public and private primary schools are Yoruba with 92.3% and 84.6% respectively. Most of the mothers (66.1%) of respondents in public primary schools are traders while more than half (53.8%) of the mothers of respondents in private primary schools are also traders. In public primary schools, 34.6% of the respondent fathers are artisans while in private primary schools, more than half of fathers of respondent are civil servants

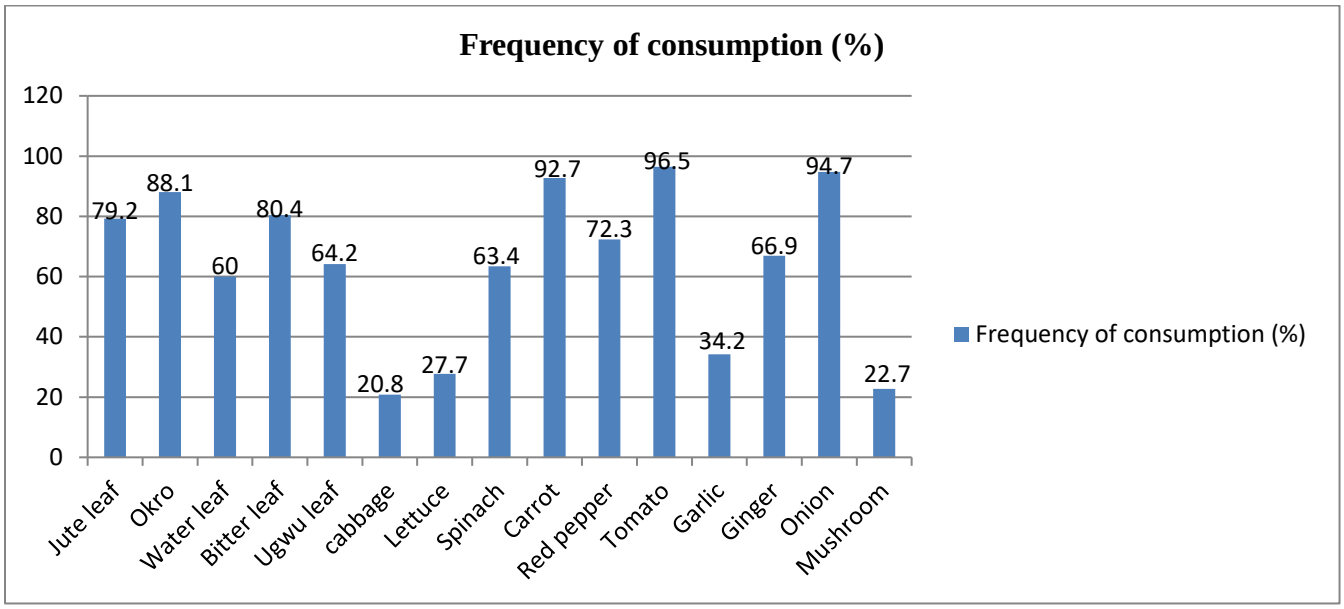

Figure I: Vegetables commonly consumed by respondents

Data in Fig, I reveals that the most consumed vegetables are tomatoes (96.5%), onions (94.2%), carrot (92.7%), Okro (88.1%), bitter leaf (80.4%), red pepper (72.3%), ginger (66.9%), and jute leaf (79.2) while the least consumed vegetables include cabbage (20.8%), lettuce (27.7%), garlic (34.2%), and mushroom (22.7%).

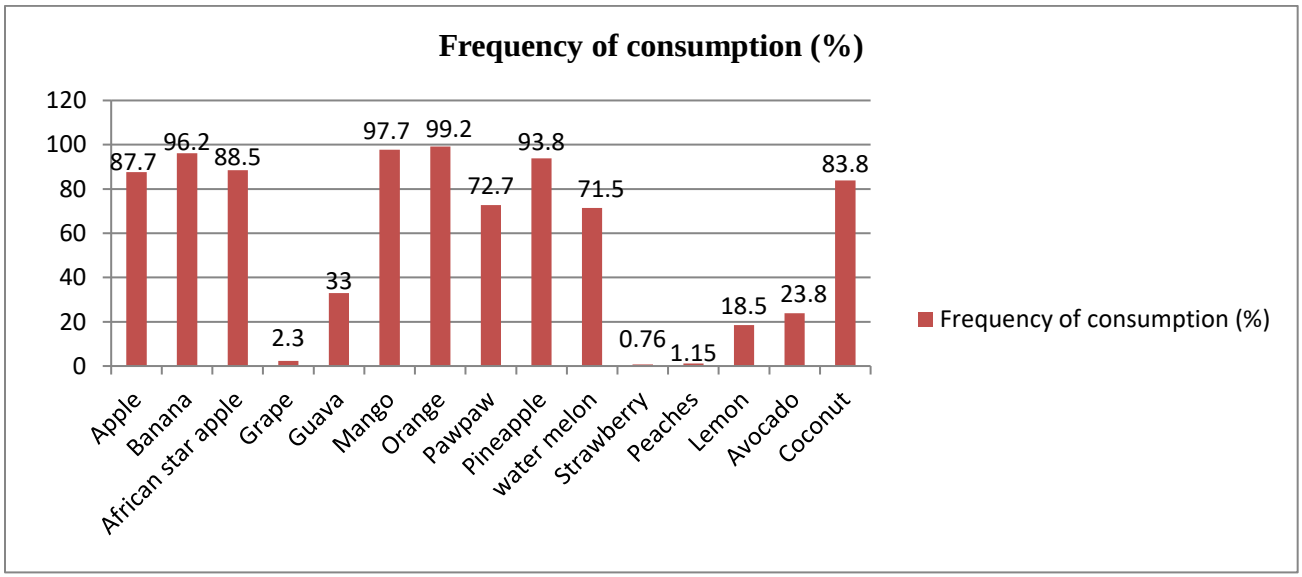

Figure II: **Fruits Commonly Consumed by Respondents**

Fig.II shows that the most consumed fruits are Orange (99.2%), mango (97.7%), banana (96.2%), pineapple (93.8%), pawpaw (91.9%), apple (87.7%), African star apple (88.5%), and coconut (83.8%) while the fruits that are less consumed are strawberry (0.76%), peaches (1.15%), and avocado (23.8)

Table II: Frequency of Vegetable Consumption by Public School Pupils

Vegetable	Never (%)	Once/week (%)	Twice/week (%)	Trice/week (%)	More than 3 times/week (%)	Daily (%)
Jute leaf (ewedu)	3.85	3.08	58.5	16.8	16.2	1.53
Okro	6.92	29.9	39.2	39.2	2.30	3.85
Water leaf	7.70	51.5	26.1	1.53	0.76	2.30
Bitter leaf	9.23	44.6	22.3	17.6	4.61	1.53
Ugwu leaf	25.4	40.8	23.7	5.38	3.08	2.30
Cabbage	60.7	26.9	8.46	3.08	0.76	0.00
Spinach	10.7	51.5	22.3	3.85	1.53	0.00
Lettuce	68.5	17.6	7.69	4.61	1.53	0.00
Carrot	6.92	25.4	39.2	17.6	4.61	1.53
Red pepper	1.53	0.76	18.5	9.23	52.3	17.7
Tomatoes	3.08	14.3	10.5	25.4	37.7	8.20
Garlic	64.6	25.4	6.92	1.53	0.76	0.76
Ginger	41.5	40.8	13.8	2.30	0.00	1.53
Onion	8.46	8.46	3.85	20.0	30.7	28.4
Mushroom	68.5	27.7	3.85	0.00	0.00	0.00

Source: field survey 2020

Results in Table II shows that among public primary school pupils 58.5%, consume jute leaf twice a week. Also,52.3% consume red pepper more than three times a week, 37.7% consume tomatoes more than 3 times a week, while 39.2% consumes okro twice in a week, However, Majority of the pupils do not consume cabbage (60.7%),garlic (64.6%), lettuce (68.5%), mushroom (68.5%) and spinach (70.7%),

Table III: Frequency of Vegetable Consumption in Private School Pupils

Vegetable	Never (%)	Once/week (%)	Twice/week (%)	Trice/week (%)	More than 3 times/week (%)	Daily (%)
Jute leaf(ewedu)	12.3	24.6	20.0	4.61	33.1	5.38
Okro	13.1	33.9	23.8	7.69	10.0	11.5
Water leaf	32.3	34.6	16.9	9.23	5.38	1.53
Bitter leaf	34.6	42.3	16.1	1.53	3.07	2.30
Ugwu leaf	42.3	31.6	17.7	1.53	3.07	3.84
Cabbage	60.8	30.7	5.38	1.53	1.53	0.00
Spinach(tete)	11.5	69.5	14.2	2.30	1.53	0.00
Lettuce	83.1	8.46	4.61	2.30	0.00	1.53
Carrot	8.46	25.3	33.9	10.8	13.1	8.46
Red pepper	1.53	4.61	13.1	30.7	44.6	5.38
Tomatoes	10.0	9.23	4.61	16.9	30.0	29.2
Garlic	68.4	17.7	10.7	0.00	0.00	3.07
Ginger	56.9	20.0	13.7	3.07	1.53	5.38
Onion	3.07	11.5	6.92	21.5	24.6	32.3
Mushroom	84.6	9.23	3.84	1.53	0.00	0.76

Result in Table III shows that in private primary school pupils, 44.6% consume red pepper more than three times a week, 30% consume tomato more than three times a week, 33.1 consume jute leaves more than three times a week , 24.6% consume onion more than three times a week, 69.5% consume spinach once a week. However, 84.6% do not consume mushroom,

Table IV: Frequency of fruit consumption in public school pupils

Fruits	Never (%)	Once/week (%)	Twice/week (%)	Trice/week (%)	More than 3 times/week (%)	Daily (%)
Apple	15.3	42.3	25.3	10.8	2.30	5.0
Banana	4.07	23.7	31.5	20.0	12.3	9.0
African star apple (agbalumo)	7.69	28.4	24.6	20.0	13.8	5.38
Grape	73.1	15.3	10.7	4.61	2.30	2.30
Guava	51.5	17.7	23.8	5.38	0.00	1.53
Mango	6.92	26.1	26.9	20.7	15.3	3.84
Orange	4.61	14.6	30.0	22.3	16.1	12.3
Pawpaw	10.0	21.5	26.1	13.8	1.53	3.84
Pineapple	42.30	26.1	13.8	12.3	3.84	1.53
Water melon	9.23	36.9	30.7	12.3	8.46	2.30
Strawberry	100.0	0.00	0.00	0.00	0.00	0.84
Peaches	100.0	0.00	0.00	0.00	0.76	0.76
Lemon	67.3	23.7	6.0	3.00	0.00	0.00
avocado	85.3	9.2	3.84	0.76	0.00	0.76
coconut	13.8	50.0	21.5	6.15	3.07	5.38

Table IV indicates that in public primary school pupils, 42.3% consume apple once twice in a week while 31.5% consumes banana twice a week, 28.4% consumes African star apple once a week 26.9% consume mango twice a week, 30.0% consume orange twice a week, 26.1% consume pawpaw twice a week, 36.9% consume water melon once a week, and 50.0% consume coconut once a week. All of the students do not consume fruits like strawberry (100%), peaches (100%)

Table V: Frequency of Fruit consumption in private school pupils

Fruits	Never (%)	Once/week (%)	Twice/week (%)	Trice/week (%)	More than 3 times/week (%)	Daily (%)
Apple	8.46	48.4	26.1	6.15	6.15	6.15
Banana	0.00	27.7	28.4	17.7	15.3	10.7
African star apple (agbalumo)	13.7	32.3	16.9	28.4	6.92	2.30
Grape	64.6	27.6	3.84	3.84	0.00	0.00
Guava	66.1	23.7	4.61	1.53	1.53	3.07
Mango	3.84	29.2	27.7	17.7	17.7	3.84
Orange	0.76	22.3	16.1	19.2	24.6	16.9
Pawpaw	16.9	48.4	10.7	12.3	5.38	6.15
Pineapple	17.7	43.7	19.2	13.7	3.84	3.07
Water melon	11.5	32.3	25.3	11.5	32.3	11.5

Strawberry	95.2	2.9	1.87	0.00	0.00	0.76
Peaches	97.9	1.07	0.00	0.00	0.00	0.00
Lemon	64.6	28.4	5.38	1.53	0.00	0.00
avocado	76.1	16.1	4.61	3.07	0.00	0.00
coconut	11.53	50.7	25.3	4.61	1.53	6.15

Table V reveals that in private primary school pupils, 48.4 consume apple once in a week, 28.4% consume banana twice a week, 32.3% consume cherry once a week, 29.2% and 27.7% consume mango once and twice a week respectively, 19.2% and 24.6% consume orange 3 times and more than 3 times a week respectively, 48.4% consume pawpaw once a week, 43.7% consume pineapple once a week, 32.3% consumes water melon more than 3 times a week, and 50.7% consume coconut once in a week. Majority of the students do not consume fruits like, grape (64.6%) guava (66.1%), strawberry (66.1%), peaches (92.3%) lemon (64.6%), and avocado (76.1%)

Table VI: Factors affecting consumption of vegetable among primary school pupils

Factors	**Always %(95%CI)**	**P-value**
Stored at home	21.9(19.1-30.8)	0.098
Available around school	8.8(6.2-12.95)	0.641
Served at home	64.6(62.5-70.6)	0.001*
Served for school lunch	20.4(18.3-29.6)	0.105
Money is available to buy	18.5(16.1-25.4)	0.195
Money is given by parent to buy	18.8(16.4-25.9)	0.175
Ignored due to lack of money	23.8(21.3-33.7)	0.084
Father's persuasion	3.5(2.1-7.0)	0.791
Mother's persuasion	15.3(13.4-21.5)	0.531
Siblings likes vegetable	66.9(64.6-73.2)	0.001*
I like the taste of vegetables	79.6(71.1-80.9)	0.0001**
I like vegetable salad	31.5(29.4-37.5)	
I like home-made stew	78.8(70.8-80.5)	0.001*

***p < 0.05, **p < 0.01**

Results in Table VI shows factors affecting consumption of vegetables with Chi-square test statistic and corresponding p-value among the primary school pupils. Serving of vegetables at home (CI = 62.5-70.6, p = 0.001), siblings like for vegetables (CI = 64.6-73.2, p = 0.001), likes for the taste of vegetables (CI = 71.1-80.9, p = 0.0001), and likes for home-made stew (CI = 70.8-80.5, p = 0.001), were factors influencing consumption of vegetables among the school pupils.

Table VII: Factors affecting consumption of fruits among primary school pupils

Factors	Always %(95%CI)	P-value
Fruit juice is available at home	35.4(31.8-38.2)	0.198
Stored at home	30.4(28.4-36.5)	0.141
Available around your school	35.8(32.1-38.6)	0.174
Fruit salad is available at home	14.2(12.6-16.4)	0.105
Served at home	64.6(62.1-67.0)	0.040*
Served for school lunch	43.8(41.7-45.4)	0.185
Allowed to buy at home or school	41.9(39.1-43.6)	0.085
Money is available to buy	48.8(45.9-51.2)	0.791
Money is given by parents specifically to buy	20.4(18.6-22.5)	0.531
Gotten cheap and affordable	24.6(22.0-26.9)	0.671
Father's persuasion	18.1(16.4-20.1)	0.684
Mother's persuasion	23.1(21.8-25.6)	0.452
Siblings likes eating fruits	61.9(59.9-64.6)	0.031*
I like eating fruits	82.3)(74.6-88.3)	
I like eating fruits because if their taste	78.8(72.3-80.7)	0.001*
I like fruit juice	83.5(75.6-89.6)	0.0001**

***p < 0.05, **p < 0.01**

Table VII shows factors affecting consumption of fruit with Chi-square test statistic and corresponding p-value among the primary school pupils. Serving of fruits at home (CI = 62.1-67.0, p = 0.040), siblings like for fruit (CI = 59.9-64.6, p = 0.031), likes for the taste of fruits (CI = 72.3-80.7, p = 0.001), and likes for fruit juice (CI = 75.6-89.6, p = 0.0001), were factors influencing consumption of fruits among the school pupils.

Table VIII: **Correlation analysis of identified factors affecting fruit consumption and frequency of fruit consumption**

Variable	Correlation (r)	Coefficientof determinant	% determination	p-value	Remark
Factors influencing fruit consumption	0.179	0.058	5.8	0.004	Significant

Significant at p ≤0.01

The correlation test on table VIIIabove shows that there wasa significant relationship(r=0.179, p=0.004) between the frequency of fruit consumption and identified factors affecting fruit consumption.

Table IX: Correlation analysis of identified factors affecting vegetables consumption and frequency of vegetables consumption

Variable	Correlation (r)	Coefficient of determinant	% determination	p-value	Remark
Factors influencing vegetable consumption	0.065	0.053	5.3	0.294	Not significant

Significant at p ≤0.05

The correlation test on the table IX shows that there was no significant relationship (r=0.065, p=0.294) between the frequency of vegetable consumption and identified factors affecting vegetable consumption.

Table X: T-Test analysis showing the difference between frequency of fruit consumption among public and private primary school pupils

Fruit consumption frequency	N	Mean	SD	Df	t-cal	t-tab	p-value
Public	130	22.30	7.29	129	2.459	1.960	0.015
Private	130	19.98	7.21				

The T-test analysis on Table X shows that the calculated t-value of 2.459 is greater than the tabulated t-value of 1.96 at p≤0.05. This implies that there was a significant difference between the frequency of fruit consumption among public and private primary school pupils.

Table XI: T-Test analysis showing the difference between frequency of vegetable consumption among public and private primary school pupils

Vegetable consumption frequency	N	Mean	SD	Df	t-cal	t-tab	p-value
Public	130	20.16	6.18	129	0.360	1.960	0.719
Private	130	19.86	7.62				

The T-test analysis on Table XI shows that the calculated t-value of 0.360 is lesser than the tabulated t-value of 1.96 at p≤0.05. This implies that there was no significant difference between the frequency of vegetable consumption among public and private primary school pupils.

DISCUSSION

The study assessed fruit and vegetable consumption among primary school pupils of Egbeda local government area, Oyo state, Nigeria. Result showed that only few fruits and vegetables are consumed frequently and this is similar to the study of Fadeiye, et al. 2019. Serving of vegetables and fruit at home, siblings like for vegetables and fruit, likes for the taste of vegetables and fruit and likes for home-made stew and for fruit juice were factors influencing consumption of vegetables and fruits among the school pupils while the identified factors affecting consumption among the pupils showed a significant relationship with their frequency of fruit consumption, there was however, no significant relationship with vegetable consumption. This corresponds with a systematic review on determinants of fruit and vegetable consumption among children and adolescents (Mett, Rikke, Knut-Inge, Leslie, Johannes, Elling & Pernille, 2006) and the study of Fadeiye, et al., 2019. There was significant difference in frequency of fruit consumption among public and private primary school pupils. However, no significant difference between the frequency of vegetable consumption among public and private primary school pupils.

CONCLUSION

Fruits and vegetables that are native and widely grown in this region are more consumed among primary school pupils Several factors influenced fruits consumption, however the daily consumption of fruit and vegetable is regarded low, and are not likely to make up the recommended amount of 400g daily by WHO because only minority of the respondents consume fruit and vegetables on a daily basis.

RECOMMENDATIONS

A school integrated nutrition education programme should be structured to raise the awareness of children and young adolescents using basic teaching techniques on the health benefits of fruits and vegetables consumption, and also to raise the awareness of parents on the importance of fruits and vegetables consumption to their children. Further studies should be aimed at assessing the knowledge of the health benefits of fruit and vegetables. Also, school lunch recipes should be reviewed to include fruit and vegetables and also schools should allow sales by vendors in and around schools.

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