



Food and Beverage Consumption among Adolescents in Alimosho Local Government, Lagos State, Nigeria
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ABSTRACT

Adolescents' diets have been found to be of lower quality as a result of their increased consumption of beverages. To assess food and beverage consumption among adolescents in Alimosho Local Government, Lagos State. A cross-sectional descriptive study was used. Data was collected in five randomly selected secondary schools in Alimosho Local Government, Lagos State. 220 adolescents (11-19) were randomly selected. Data were obtained on sociodemographic and socioeconomic characteristics, nutrient intake, and beverage intake using pre-tested self-administered questionnaires, and 24-hour dietary recall. The data were analyzed and presented using descriptive and inferential statistics. Statistical significance was established at $P = .05$. The highest age range of participants was between ages 15 to 18 years (56.8%), and most respondents were female. Carbohydrate intake was excessive among the male (100%) and female (96.5%) respondents. There is inadequate intake of protein (45.5%) and fat (31.2%) among the male respondents compared to female respondents with protein (4.2%) and fat (7.0%). Most of the respondents (44.5%) consume hot beverages e.g., tea, coffee, etc. 1-5 times a week. More than half (61.8%) of the respondents do not consume alcohol at all. There was a significant relationship between gender and protein intake ($P = 0.002$), and gender and fat intake ($P = 0.001$) respectively. There was high consumption of beverages such as energy drinks, sodas, alcohol, and herbal drinks among the respondents, revealing unhealthy dietary habits. This study also reveals that most of the respondents had excess energy.

Keywords: Nutrient intake, Dietary habit, Beverage consumption, Adolescent

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INTRODUCTION

According to the World Health Organization (WHO), adolescents are referred to as children between the ages of 10 and 19 years, a time of fast growth in both physical and emotional development *WHO (2014)*. There are approximately 1.2 billion adolescents worldwide, accounting for more than 18% of the global population. Nearly 90% of adolescents live in developing countries, with approximately 600 million females *Ben et al. (2014)*. Adolescence is characterized by rapid growth and development, with up to 45 percent of skeletal growth and 15 to 25% of adult height occurring. Rapid stature, muscle, and fat growth put a person at risk for nutritional deficiencies and other health problems *Hadush et al. (2021)*.

The risk of being overweight or obese has been linked to beverage consumption. Adolescents frequently consume large amounts of beverages *Monteiro et al. (2016)*. Adolescents eating patterns have undergone significant changes in many parts of the world, and these changes can be seen in their consumption of processed foods that have a high energy density and are high in fat, sugar, and sodium, as well as their consumption of less produce, less calcium, iron, and protein sources *Colucci et al. (2011)*. It is important to encourage adolescents to adopt healthy behaviors because habits formed throughout adolescence have a tendency to persist throughout life *Vézina-Im et al. (2017)*.

In order to stay properly hydrated, beverages are a crucial source of fluids. However, the amount of fluids needed by physically active persons depends on a variety of factors, including climate, age, sex, body size, perspiration production, dietary habits, and the amount of time spent exercising *Bibiloni et al. (2016)*. The reduction of sugar intake is a global public health concern, and processed foods and drinks are the main sources of total sugar intake *Hwang et al. (2020)*.

The nutritional status of individuals is obviously considered an indicator of health status, which is an element of resistance against intercurrent diseases. An optimal nutritional status can transcend an individual, and a poor diet in a population can be considered a risk factor for bad nutritional status *Abadia et al. (2021)*. Adolescents' diets have been found to be of lower quality as a result of their increased consumption of beverages and the reduction of milk and dairy products was associated with the increased intake of beverages *Louzada et al. (2015)*. Parental education level and socioeconomic status are factors associated with malnutrition in adolescents *Soekatri et al. (2020)*. Taste and price were the most important factors in choosing beverages among adolescents *Block et al. (2013)*. Individual factors, such as gender, age, screen-based sedentary behavior, physical activity, fruit and vegetable intake, fast food intake, sleep satisfaction, depressive symptoms, stress, current alcohol consumption, and current smoking behaviors, are linked to beverage consumption among adolescents *Schneider et al. (2020)* and *Ra et al. (2022)*. Excessive consumption of beverages is associated with the development of metabolic syndrome, type 2 diabetes, poor oral health, alterations in the metabolism of insulin and glucose, and blood pressure elevation. It is also related to the inappropriate intake of calcium, fibers, proteins, and vitamin D, excess weight, increased waist circumference, increased cholesterol, serum triglycerides, and blood pressure *Kimber (2016)*. An increase in unhealthy beverage consumption increases the prevalence of chronic diseases such as obesity, type 2 diabetes, and hypertension. It also increases total caloric intake, which is linked to chronic disease risk, and weight gain, increasing the global burden of chronic disease *Schneider et al.*

(2020). The aim of the study is to assess food and beverage consumption among adolescents in Alimosho Local Government, Lagos State.

MATERIALS AND METHODS

Study Design

A descriptive cross-sectional design was used to carry out this study among adolescents in Alimosho Local Government, Lagos State

Study Area

Alimosho is a local government area in the Ikeja Division of Lagos State, Nigeria. It is the largest local government in Lagos, with 1,288,714 inhabitants, according to the official 2006 Census.

Sampling Technique and Procedure

A multistage sampling method was used for this study.

Stage 1: A Simple random sampling method was used to select five secondary schools in the Alimosho Local Government Area, Lagos state.

Stage 2: A Simple random sampling technique was used to select 220 respondents from the five selected schools in Alimosho local government area, Lagos state.

Study Respondents

The study respondents comprised adolescents between the ages of 11 to 19 in the Alimosho Local Government Area in Lagos State.

Sample Size Determination

The sample size was determined using Fischer's sample size formula as shown below:

Minimum sample size (n) = $\frac{Z^2 \times p \times q}{d^2}$ *Sin-Ho. (2014)*

$$d^2$$

Where n = desired minimum sample size when the sample frame is more than 10,000

Z = table value for the standard normal deviation corresponding to the 95% significance level (1.96).

P = Prevalence of beverage consumption which is 0.156 *Wysokińska et al. (2022)*

D = Margin error, (5%) set at +0.05

Therefore, n = $\frac{(1.96)^2 \times 0.156 \times (1-0.156)}{(0.05)^2} = \frac{3.8416 \times 0.156 \times 0.844}{0.0025} = (202)$

$$(0.05)^2$$

$$0.0025$$

The sample size (N) for the study was increased to three hundred and seventeen (220) respondents to cater for attrition and possible dropout.

Method of Data Collection

Data on socio-demographic and socio-economic were obtained using a semi-structured pre-tested interviewer-administered questionnaire. The dietary intakes of the respondents were assessed using a 24-hour dietary recall method described by *FAO (2018)*. and the beverage intakes of the respondents were assessed using a semi-structured pre-tested beverage consumption pattern questionnaire. The respondents were probed for in-between meals and snacks. The quantities of food and drink consumed were estimated using standard household measures.

Data Analysis

All statistical analysis with descriptive statistics was carried out using statistical package software (SPSS version 22). Data from a 24-hour dietary recall was analyzed using NutriSurvey for Windows. The data were summarized using frequency, percentage, mean, and standard deviation. The chi-square test was used to test the relationship among variables at $P < 0.05$.

RESULTS AND DISCUSSION

Results

Socio-demographic Characteristics of the Respondents.

Table 1 shows the socio-demographic characteristics of the respondents. It was revealed that the majority of the respondents were females (65%). The highest age range of participants was between ages 15 to 18 years (56.8%). Most of the respondents (92.7%) came from a monogamous family, while 7.3% came from a polygamous family.

Table 1: Socio-demographic Characteristics of the Respondents (n=220)

Variable	Frequency	Percent
Gender		
Male	77	35
Female	143	65
Age		
10 – 12	2	0.9
13 – 14	89	40.5
15 -18	125	56.8
19	4	1.8
Religion		
Christianity	160	72.7
Islam	54	24.5
Traditional	6	2.7
Ethnic group		
Hausa	2	0.9
Igbo	5	2.3
Yoruba	207	94.1
Others	6	2.7
Family structure		
Monogamy	204	92.7
Polygamy	16	7.3
Family Size		
2 – 5	152	69.1
6 – 10	62	28.2
>10	6	2.7

Socio-economic Characteristics of the Respondents

Table 2 shows the socio-economic characteristics of the respondents. The majority (77.3%) of the respondent's fathers had completed tertiary education, and 75.9% of the respondents' mothers had attained tertiary education.

Table 2: Socio-economic Characteristics of the Respondents

Variable	Frequency	Percent
Father Educational Status		
No Formal Education	3	1.4
Primary	13	5.9
Secondary	34	15.5
Tertiary	170	77.3
Mother Educational Status		
No Formal Education	3	1.4
Primary	7	3.2
Secondary	43	19.5
Tertiary	167	75.9
Father occupation		
Civil Servant	88	40
Trader	23	10.5
Artisan	6	2.7
Others	103	46.8
Mother Occupation		
Civil Servant	86	39.1
Trader	82	37.3
Artisan	3	1.4
Others	49	22.3

Beverage Consumption Pattern of the Respondents

Table 3 shows the beverage consumption pattern of the respondents. 57.7% of the respondents consumed fruit juice 1 to 5 times within the week. Most of the respondents (44.5%) consume hot beverages e.g., tea, coffee, etc. 1-5 times a week. 61.8% of the respondents do not consume alcohol at all. Only 1.4% of the respondents consumed other drinks such as food supplement drinks.

Table 3: Beverage Consumption Pattern of the Respondents

Variable	Frequency (times per week)	Percent
Sodas		
0	21	9.5
1 – 5	137	62.3
6 – 14	62	28.2
Fruit Juices		
0	34	15.5
1 – 5	127	57.7
6 – 14	46	20.9
15 – 20	13	5.9
Hot Beverage		
1 – 5	98	44.5
6 – 14	87	39.5
15 – 20	4	1.8
>20	8	3.6
Sport and Energy Drink		
0	68	30.9
1 – 5	119	54.1
6 – 14	33	15.0
Alcoholic Beverages		
0	136	61.8
1 – 5	73	33.2
6 – 14	10	4.5
>20	1	0.5
Herbal Drink		
0	83	37.7
1 – 5	132	60.0
6 – 14	5	2.3
Any Other		
0	217	98.6
1 – 5	3	1.4

Nutrient Intake of the Respondents

Table 4 shows the nutrient intake of the respondents. Half of the male (53.2%) and female (96.5%) respondents had excess energy intake. All the male respondents (100%) had excess carbohydrate intake, and the majority (96.5%) of the female respondents had excess carbohydrate intake. 18.9% of the female and 22.1% of the male respondents had adequate protein intake. Most of the female (74.1%) and male (35.1%) respondents had excess fat intake

Table 4: Nutrient Intake of the Respondent

Variables	Female (n = 143)				Male (n = 77)				P-value
	RDA	Inadequate N (<60% of RDA)	Adequate N (60-80% of RDA)	Excess N (>80% of RDA)	RDA	Inadequate N (<60% of RDA)	Adequate N (60-80% of RDA)	Excess N (>80% of RDA)	
Energy(kcal)	1800	1(0.7)	4(2.8)	138(96.5)	2200	17(22.1)	19(24.7)	41(53.2)	0.770
Carbohydrate (g)	247.5	3(2.1)	2(1.4)	138(96.5)	302.5	0(0.0)	0(0.0)	77(100.0)	0.187
Protein (g)	90	6(4.2)	27(18.9)	110(76.9)	110	35(45.5)	17(22.1)	25(32.5)	0.002
Fat(g)	50	10(7.0)	27(18.9)	106(74.1)	61.1	24(31.2)	26(33.8)	27(35.1)	0.001
Dietary fibre (g)	25.2	0(0.0)	14(9.8)	129(90.2)	30.8	29(37.7)	25(32.5)	23(29.9)	0.587

Discussion

This study observed that there were more female participants than male participants, and the majority of the respondents were between the ages of 15 and 18 years. This is similar to a study conducted by *Saniya et al. (2021)* where most of the respondents were also females and between the ages of 14 to 18 years.

The beverage consumption pattern of the respondents reveals that 54.1% of the respondents consume energy drinks 1-5 times a week, and 33.2% of the respondents consume alcohol 1-5 times a week. This is similar to a study carried out by *Park et al. (2016)* where 59.8% of the respondents consume energy drinks 1-4 times a week. 49.0% of the respondents consume alcohol 1-4 times a week. *Nicole et al. (2018)* reported that there was low consumption of fruit juice among study participants and it was observed that the decrease in consumption of fruit juice happens as a child gets older. *Paulson et al. (2018)* found that the majority of the respondents were obese, which was a result of their frequent consumption of sugar-sweetened beverages.

Caffeine, which is the main ingredient in energy drinks, is one of the most commonly used psychoactive chemicals, and it has significant impacts on how people wake up and go to sleep *Roehrs and Roth (2008)*. Regardless of the level of physical activity, alcohol usage, or junk food intake, adolescents who drank energy drinks five or more days a week were more likely to experience mental health problems such as difficulty sleeping, stress, a sad mood, and suicidality *Park et al. (2016)*. Consuming energy drinks is also linked to other frequently reported health issues like disturbed sleep, fatigue, difficulty falling asleep on time, headaches, irritability, and stomachaches *Holubcikova et al. (2017)*. *Marczinski et al. (2017)* opined that although energy drinks are consumed alone, they are also frequently mixed with alcohol, and individuals who consume alcohol mixed with energy drinks tend to consume more than when they drink alcohol alone. Beverage consumption has been associated with unhealthy dietary behaviors *Poulos et al. (2015)*. This study reveals that 38.2% of the respondents are current alcohol drinkers, which was slightly lower among secondary school students in Port Harcourt where 30.6% were current alcohol drinkers. Studies carried out in Thailand and the Philippines revealed that 22.2% and 25.0% of the adolescents, respectively, were current alcohol drinkers. *Pengpid et al. (2019)*. It was very high among adolescents in Rivers, where 65% of them were current alcohol drinkers.

Most of the male and female respondents had excess energy intake. They also had an excess intake of carbohydrates, protein, and fat. In both males and females, a large amount of energy was derived from carbohydrates and a smaller portion from fat and protein which could be attributed to the high consumption of starchy foods. This is similar to a study carried out among adolescents in Tanzania where both males and females had low energy intake and excess carbohydrate and protein intake *Nicholaus et al. (2020)*. *Parimalavalli et al. (2011)* reported that adolescents in India's mean nutrient intake was significantly lower when compared with the Recommended Dietary Allowance, which could lead to a higher disease incidence among adolescents. Among adolescents in Umuahia, Nigeria it was revealed that both male and female energy, protein, and fat intake were below the recommended dietary allowance, and both sexes had a high carbohydrate intake *Ogechi (2015)*.

CONCLUSION

This study shows a high intake of beverages such as energy drinks, sodas, alcohol, and herbal drinks. Which could put them at risk of non-communicable diseases. The majority of the adolescents also had inadequate nutrient intakes, which could be attributed to their high beverage consumption. Therefore, effective nutrition education should be encouraged among secondary school students in their various schools. They should also be advised to engage in adequate physical activity, as this helps them to be fit and reduces the burden of some non-communicable diseases.

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Authors' Contributions

This study was carried out in collaboration between all authors. Authors A and D designed the study. Authors B and C were involved in data analysis and interpretation, the drafting of the manuscript, and critically revising the manuscript for significant intellectual content.

Competing Interest

The authors have declared that no competing interests exist.

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Consent

Written informed consent was obtained from the respondent before administering the questionnaires.

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