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Influence of Consumption of Sweetened Drinks/ Beverages on the Nutritional Status of Primary School Pupils

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Abstract:

This study investigated the influence of the consumption of sweetened drinks/beverages on the nutritional status of primary school pupils in Lagos State. The study adopted a descriptive survey design. Population comprised 3,945 primary 5 and 6 pupils in the 77 public primary schools in Epe Local Government in the 2021/2022 academic session, while purposive sampling technique was used to select 289 respondents from the population. Structured questionnaire and Body Mass Index (BMI) were the instruments for data collection. Mean and standard deviation were used to answer the research questions while ANOVA and T-test were used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that the drinks and beverages commonly consumed by the pupils included soft drinks, yoghurt, fruit juice, ribena and ice cream. Also, drinks and beverages consumption influenced the nutritional status of the pupils; P value (0.75) and (0.20) is greater than alpha (0.05). Furthermore, BMI of the male and female pupils recorded majority of the pupils having normal weight (50% girls and 40% boys), followed by underweight (20% girls and 18% boys), for the pre-obese pupils, (17% are girls and 20% boys). Percentage of the obese pupils was 13% girls and 22% boys. On the basis of the findings, it was recommended that Nutrition Education should be integrated into the curriculum of primary schools. Also, parents should ensure that their children eat breakfast before going to school daily.

Keywords: Food, sweetened drinks, consumption, nutritional status, primary school pupils

1. Introduction

Food is an essential of life that provides us with the energy we need for growth, physical activity, and the basic body functions (breathing, temperature control, blood circulation and digestion). It gives us the materials needed to build and maintain our bodies and to protect them from disease (Glasauer, Peter, Sharman & Jane, 2015). Food is needed to supply the body with energy, promote growth and replace worn out tissues, and generally to maintain and sustain the activities of the body. Foods therefore must be adequate in nutrient (i.e., the chemical components of food that help to carry out body's physiological functions and are only released for the use of body after the food substance has been ingested, digested and absorbed).

The human body requires a certain amount of micro-nutrients such as energy, protein fats and micro-nutrients to maintain a good health (UNICEF, 2013). Lack of one or more of the above for a child can lead to malnutrition, which is a problem for an individual to live a healthy life. Nutrition therefore plays a very significant role in child growth, which should neither be inadequate nor excessive in order to improve and enhance child's learning ability. Nutritional status can be categorized into desirable's nutrition, under nutrition and over nutrition.

Nutrition is considered desirable when body tissue have enough of the nutrient to support normal metabolic function as well as surplus stores that can be mobilized in these times of increase needed. As opined by Margaret (2013), optimal nutrition translates into a stronger and healthier population with greater opportunities of breaking the cycle of poverty and achieving better quality of life. Attaining optimal nutrition involves eating three meals a day and two nutritious snacks, limiting the intake of high sugar and high fat foods as well as consuming generous amount of fruit, vegetables, lean meats and low-fat dairy products including three service of milk, cheese or yoghurt to meet their calcium requirements, can also prevent many medical problems. Child nutrition outcomes are recognized as key indicators for tracking the nutrition and health status of school children (De Onis in Fadare, 2019).

However, under nutrition occurs when nutrient intake does not meet the nutrient needed by the body, and there will be no reserve to embark upon during the period of increase need. Over nutrition occurs when there is prolonged

consumption of more nutrient than the body needs. Both under nutrition and over nutrition are referred to as malnutrition, which may impair both the growth and cognitive development of primary school children (Singh & West in Ajuzie, Sanusi & Makinde, 2018). As observed by Wu, Imhoff-Kunsch & Girard (2021), undernourished children have an increased risk of mortality, are more likely to suffer a childhood illness, be cognitively impaired, perform poorer in school, have lower earning potential and carry higher risks for non-communicable diseases in later life as many major risk factors for disease in developing countries (that is, blood pressure, cholesterol, overweight, obesity low fruit and vegetable intake, and iron deficiency) are nutrition related.

Primary school children are school aged children in late childhood stage. At late childhood stage according, children are within ages 6 to 12 years. Late childhood stage is one of the most fascinating and complex transitions in the life span of man. This stage is a developmental period characterized by steady growth spurt and development of increased manual dexterity and resistance to fatigue. They are easily influenced by their peers and often times; tend to engage in feeding practice adopted by their peers. School aged period is nutritionally significant because it is the prime time to build up body stores of nutrients in preparation for rapid growth and development at adolescence. Nutrition plays a vital role, as inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduce work capacity, poor mental and social development.

Nutritional needs during school aged period are increased because of the advancement in growth rate and development. Attitudes and behaviours to drinks are formed early in life but may be modified. School aged children are not bothered about what they drink, so adults around them have to keep watch what, where and with whom they drink because it determines their drinking patterns. Nutrition is the selection of drinks, preparation of drinks, and their ingestion to be assimilated by the body (Awoyemi & Jogunola, 2010). Nutrition is the science that deals with the intake of drinks and how the body handles the substances (nutrients) in the drinks consumed for growth, development and maintenance of life. Adequate nutrition is important for a variety of reasons including optimal cardiovascular function, muscle strength, respiratory ventilation, and protection from infections; wound healing and psychological wellbeing. Adequate nutrition also helps prevent nutrition related diseases.

Adequate nutrition entails a drinking habit that involves nutritious drinks that are required for body building, energy supply, body defence and regulatory functions in quantities commensurate with the body needs. Poor drinking habit entails consuming drinks in ways not commensurate with body needs. This can either be in form of inadequate intake of some nutritious drinks or overconsumption of some drink nutrients. School aged children are particularly vulnerable to the adverse effects of poor nutrition because their bodies are growing and developing rapidly. A poor drinking habit can lead to serious short and long-term health problems, which may persist into later adult years. Poor drinking habit entails the high consumption of sugar, salt, saturated fat and other high-calorie, low-nutrient dense drinks. These are some of the constituents of most sweetened drinks and beverages.

Nisar, Qadri, Shetima & Perveen (2009) described sweetened and carbonated drinks as drinks that do not contain the nutrients that the body needs to stay healthy. Hence, these drinks have poor nutritional value and are considered unhealthy. Sweetened drinks and beverages can also be described as drinks which are perceived to have little or no nutritional value, but which also have ingredients considered unhealthy when drunk regularly, or to those considered unhealthy to consume at all.

As a result, sweetened drinks and beverages can be categorized into sweetened drinks, carbonated drinks, beverages and fruit juices (Oguntona, 2013). Popular sweetened drinks include soft drinks (coke, fanta, bigi, H2O, Teem etc.) fruit juices with preservatives (vijumilk, chivita, five alive, yoghurts etc.) sodas and carbonated drinks (lacassera etc.) as well as beverages (bournvita, millo, ovaltine, cowbell choco etc.). All public primary schools in Lagos State have drink vendors where varieties of these drinks are sold. Many people have raised concerns about the nutritional quality of these drinks not only for children and adolescents but also for adults. However, with researches and innovation in drinks and nutrition, different types of drink recipes are developed aimed at enriching the nutrition components of these drinks (Uche, 2013).

Nutritional status is a condition in which the body is influenced by diet; the levels of nutrients in the body and the ability of those levels to maintain normal metabolic integrity. Nutritional status is influenced by the amount of each essential nutrient that an individual consumes. Adequacy of nutritional status is assessed by measuring weight and height; the result is commonly expressed as the body mass index (BMI), the ratio of weight (kg) to height (m). There are also standard BMI measurements for adequately nourished children. Hence, in determining the nutritional status of school children, their weight and height for age are compared with standard measurements for adequately nourished children. The most used anthropometric indicators for nutritional status of school aged children are stunting (Height for Age); wasting (Weight for Height); underweight (Weight for Age) and mid-upper arm circumference (MUAC).

The relationship between sweetened drinks/beverages intake and nutritional status of school aged children is that children tend to consume drinks higher in sugar and additives and lower in minerals and vitamins when they drink outside their homes. Drinking low nutrient drinks in moderation does not pose a serious threat to the nutritional status of a child whose basic drinking habits are nutritionally sound. However, when carried to extremes or when practiced by the child who does not have good drinking practices; it may compromise growth and maintenance of body functions.

Factors that may influence sweetened drinks and beverages consumption include economic status of the family, education of the parents, nutritional knowledge of the child, ethnic origin, social attitudes and behaviours, media influence, personal preferences and personal behaviours and inadequate school nutrition education programs. Messages for healthy drinking are getting undermined at every turn by the relentless number of drink advertisements. Hence every individual parent in the society needs to be educated about such drinks and their impact on children's health. Challenge's school

children face in an attempt to satisfy their appetites include taste and quality, cost and health, nutrition knowledge of parents and peers. Adequate drink consumption practices for pupils must be supported by care, time, attention and skills of the parents, family, school and society. It is based on this background that the study will be carried out to determine the influence of sweetened drinks and beverages consumption on the nutritional status of pupils in public primary schools in Epe Local Government Area of Lagos State.

Esther (2017) citing World Health Organization (WHO) stated that school aged children's malnutrition is a worldwide epidemic, affecting one-third of all children. Malnutrition has long-term impacts on physical and mental capacity and the pupils' ability to learn. Health and nutrition problems among pupils prevent them from attending school regularly, impair their ability to learn, and often cause them to leave school early. Educators daily compete with a myriad of learning impediments in their classrooms, not the least of which is improperly nourished students who struggle with focus, class participation and knowledge retention. Such pupils' exhibit diminished attention span.

Unhealthy drinking habit increases the risk of malnutrition. Consuming less-healthy types of drink, coupled with low levels of physical activity can lead to weight gain in children; however, not drinking enough can also have negative effects on a child's development, learning capacity and nutritional status. This study was, therefore, carried out to investigate the influence of sweetened drinks and beverage consumption on the nutritional status of pupils in public primary schools in Epe Local Government Area of Lagos State.

1.1. Purpose of the Study

The major purpose of this study was to investigate the influence of sweetened drink and beverage consumption on the nutritional status of pupils in public primary schools in Epe Local Government Area of Lagos State. Specifically, the study determined:

- The type of sweetened drinks and beverages commonly consumed by primary school pupils in Lagos State;
- The extent to which the consumption of sweetened drinks and beverages influences Body Mass Index (BMI) of the male and female pupils;

1.2. Research Questions

The following research questions were raised to guide the study:

- What are the sweetened drinks and beverages commonly consumed by primary school pupils in Lagos State?
- To what extent would the consumption of sweetened drinks and beverages influence the Body Mass Index (BMI) of the male and female pupils?

1.3. Hypotheses

Two null hypotheses were formulated and tested at 0.05 level of significance:

- H1: There is no significant difference in the nutritional status of the pupils that consume sweetened drinks and beverages and those that do not
- H2: There is no significant difference in the influence of sweetened drinks and beverages consumption on nutritional status of the male and female pupils?

2. Methodology

The study adopted a descriptive survey design. Descriptive survey is a type of study which aims at collecting data and describing in a systematic manner the characteristics, features or facts about a given population under study (Aromolaran, 2011). The total population for the study entailed three thousand, six hundred and eighty-two (3,945) primary 5 and 6 pupils currently in the 77 public primary schools in Epe Local Government Area of Lagos State in the 2021/2022 academic session. The number was made available to the researcher by the office of the secretary, Local Government Education Authority, Epe. Purposive sampling technique was used to select 18 schools from the 77 public primary schools in the local government area while the sample size of three hundred and sixty (289) primary 5 and 6 pupils was drawn from the population using the "Yaro Yamane" formula.

1.1. Research Instrument

Two instruments were used for data collection. One of the instruments was a structured questionnaire developed by the researcher and used for collecting data on the categories of food commonly consumed by the pupils. The questionnaire was titled "Fast Food Consumption Questionnaire" (FFCQ). The items in the questionnaire were rated on a four-point scale of never consumed (NC)-1; Fairly Often Consumed (FOC)-2; Often Consumed (OC)-3 and Very Often Consumed (VOC)-4. The second instrument Body Mass Index (BMI) was used to determine the nutritional status of the pupils by obtaining data on the pupils' age, height and weight.

The instruments were subjected to face validation by two Home Economics experts from the Department of Home Economics, School of Vocational Education, Michael Otedola College of Primary Education, Noforija-Epe, Lagos State. The split half technique was used to determine the consistency of the instruments through a pilot study. The instrument was administered to twenty respondents who are part of the population but not the sample. The data collected were shared into two-half in order of even and odd numbers. The sets of scores were correlated using Pearson Product Moment Correlation (Pearson R) to determine the reliability coefficient of 0.80 which indicates that the instrument is highly reliable.

1.2. Administration and Data Analysis

The researcher administered copies of the questionnaire to the primary 5 and 6 pupils with the help of three research assistants who were trained by the researcher on the method of administration and retrieval of the questionnaires. The instruments were retrieved on the spot after completion. The second instrument was used to determine the pupil's anthropometric measurement and BMI; weight for height; height for age; and weight for age. The pupil's weight and height were measured and their age recorded. The nutritional status was determined using their age, weight and height as the variables. For weight, each pupil was asked to stand bare foot on a weighing scale after removing any article that would increase the actual weight. The weight was recorded to the nearest 0.1kg. For the height, a microtoise was used. Each pupil was asked to stand vertically against a wall on which a microtoise has been attached and the result recorded to the nearest 0.1mm. The data collected were analyzed using mean and standard deviation to answer the research questions while ANOVA and T-test were used to test the hypotheses at 0.05 level of significance. Any value calculated equal or greater than mean 2.50 was considered as consumed while mean value below 2.50 will be regarded as not consumed.

3. Results

3.1. Research Question 1

What are the sweetened drinks and beverages commonly consumed by primary school pupils in Lagos State?

S/N	Drinks Commonly Consumed	Mean	SD	Decision
1	Soft drinks	3.61	0.20	VOC
2	Yoghurt	3.43	0.51	VOC
3	Fruit Juice	3.54	0.24	VOC
4	Ribena	3.56	0.14	VOC
5	Ice cream	3.64	0.25	VOC
6	Caprisone	3.40	0.28	VOC
7	Chocolate drinks	3.58	0.34	VOC
8	Milk Drinks	3.22	0.52	VOC
9	Traditional Drinks (Zobo, Kunnu etc.)	2.89	0.88	VOC
10	Whole fruits	2.31	0.67	FOC

Table 1: Mean and Standard Deviation of Sweetened Drinks and Beverages Commonly Consumed by Primary School Pupils in Lagos State

Source: Fieldwork, 2021

FOC - Fairly Often Consumed, OC - Often Consumed, VOC - Very Often Consumed

The results presented in table 1 shows the means ranging from 2.31 to 3.64, while the standard deviation ranged from .20 to 1.06. From the table all the drinks were accepted as being very often consumed while whole fruits recorded fairly often consumed.

3.2. Research Question 2

To what extent would the consumption of sweetened drinks and beverages influence the Body Mass Index (BMI) of the male and female pupils?

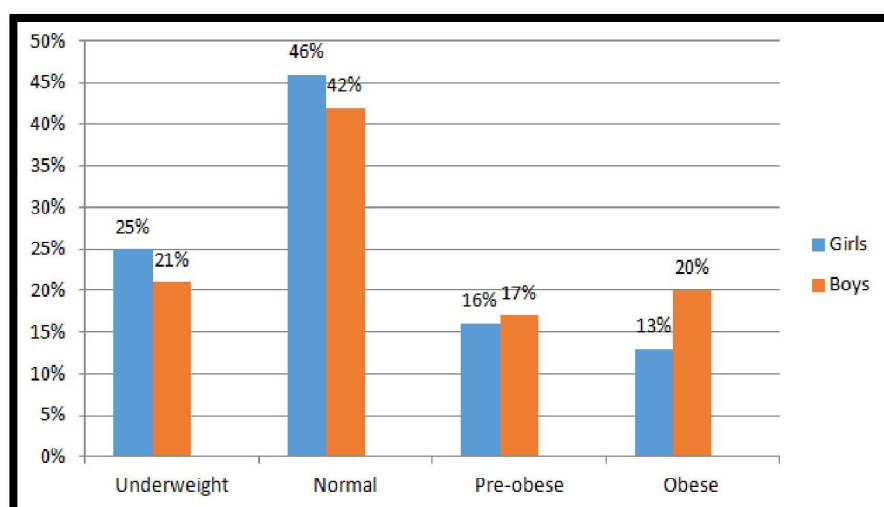


Figure 1: Table Showing Summary of Body Mass Index (BMI) of the Male and Female Pupils

Figure 1 indicated the BMI of the male and female pupils. From the table, majority of the pupils have normal weight (46% girls and 42% boys), followed by underweight (25% girls and 21% boys), for the pre-obese pupils, (16% are girls and 17% boys). Percentages of obese pupils were 13% girls and 20% boys.

3.3. Test of Hypotheses

The hypotheses were tested using t-test at 0.05 level of significant. The analyses are presented in tables 3 and 4 using the following keys:

X_1 = Mean of Male Pupils

S_1^2 = Variance of Male Pupils

X_2 = Mean of Female Pupils

S_2^2 = Variance of Female Pupils

Df = 354

P = 0.05

t-tab = 1.56

S = Significant

NS = Not Significant

- Hypothesis 1: There is no significant difference in the nutritional status of the pupils that consume sweetened drinks and beverages and those that do not

S/N	How Often Do You Consume the Following Drinks	X_1	S_1^2	X_2	S_2^2	t-cal	Remark
1	Soft Drink	3.30	0.99	3.33	0.75	0.21	NS
2	Yoghurt	3.70	1.07	3.80	1.24	0.47	NS
3	Fruit Juice	2.83	1.10	3.10	1.26	0.38	NS
4	Ribena	3.56	1.30	3.70	1.39	0.04	NS
5	Ice Cream	3.61	1.34	3.66	1.21	0.45	NS
6	Caprisone	2.98	1.33	3.44	1.47	0.46	NS
7	Chocolate Drinks	3.25	1.34	3.56	1.19	0.33	NS
8	Milk Drinks (Viju, Bobo and others)	2.86	1.19	3.80	1.03	0.43	NS
9	Traditional Drinks (Zobo, Kunnu etc.)	3.81	1.17	3.85	1.04	0.01	NS
10	Whole Fruits	3.80	1.12	3.90	1.26	0.55	NS

Table 2: T-Test Analysis of the Significant Difference in the Nutritional Status of the Pupils That Consume Sweetened Drinks and Those That Do Not Consume Sweetened Drinks
Source: Field Study, 2021

Data presented in table 2 revealed that each of the ten (10) sweetened drinks/Beverages mentioned had their calculated t- values ranging from 0.01 to 0.55 which were less than t-table value of 1.56 at 0.05 level of significance and at 177 degrees of freedom (df). This indicated that there was no significant difference in the nutritional status of the pupils that consume sweetened drinks/Beverages and those that do not. Therefore, the null hypothesis of no significant difference in the nutritional status of those that consume sweetened drinks/Beverages and those that do not was upheld.

- Hypothesis 2: There is no significant difference in the influence of sweetened drinks and beverages consumption on nutritional status of the male and female pupils?

		Mean (SD)	P-value	Decision
Snack Consumption	Boys: NC	3.20 (1.47)	0.25	NS
	FOC	3.41 (1.52)		
	OC	2.94 (1.08)		
	VOC	8.23 (1.76)		
	Girls: NC	3.45 (0.89)	0.32	NS
	FOC	3.32 (1.99)		
	OC	3.41 (2.06)		
	VOC	6.98 (1.60)		
Nutritional Status	Underweight (<18.5)	7.23 (1.57)	0.20	NS
	Normal (18.5 – 22.9)	5.47 (1.90)		
	Pre Obese (23.0-27.4)	6.98 (1.67)		
	Obese Class (27.5-34.9)	5.87 (1.49)		

Table 3: T-Test Analysis Showing Significant Difference in the Influence of Sweetened Drinks/Beverages Consumption on Nutritional Status of the Male and Female Pupils

Data presented in table 3 revealed that each of the sweetened drinks/Beverages consumption categories of the male and female pupils had their calculated t- values ranging from 0.03 to 0.45 which were less than t-table value of 1.56

at 0.05 significance level. This indicated that there was no significant difference in the influence of sweetened drinks/Beverages consumption on nutritional status of the male and female pupils.

4. Discussion of Findings

Findings of the study indicated the drinks commonly consumed by the pupils. All the drinks were accepted as being very often consumed while whole fruits recorded fairly often consumed. This implies that the pupils consume sweetened drinks a lot. This finding aligns with the opinion of Oguntola (2013), who reported in their study that sweetened drinks such as "bobo", "caprisone", "Chi Happy Hour", ribena and the likes are the most commonly chosen drinks for pupils and account for about 6% of their total caloric intake. Also, in support of this finding, Hadad (2016) is of the opinion that consumption of sweetened and energy drinks, high fat fast foods contribute to higher energy and fat intake and lower intake of healthful nutrients.

Findings also showed that drinks and beverages consumption have influence on the nutritional status of the pupils. In agreement to this finding, Cawleley and Mayerhoefer (2012) opined that although the prevalence of obesity is increasing worldwide, the increase has been faster in developing countries because of declining levels of physical activity as well as nutrition transition characterized by a trend towards consumption of a diet high in fat, sugar and refined foods and low in fibre. Han, Tijhuis, Lean & Seidel (2018), mentioned that changing food consumption practices in a sensible way and increasing physical activity are the best ways to do this.

Findings also indicated that the BMI of the male and female pupils recorded majority of the pupils having normal weight (50% girls and 40% boys), followed by underweight (20% girls and 18% boys), for the pre-obese pupils, (17% are girls and 20% boys). Percentage of obese pupils was 13% girls and 22% boys. Hadad (2016) mentioned that in children, malnutrition such as protein/calorie deficient diet results in underweight, wasting and lowered resistance to infection, stunted growth and impaired cognitive development and learning. World Health Organisation (WHO) (2010) stated that children malnutrition is a worldwide epidemic, affecting one-third of all children.

Findings indicated that there was no significant difference between the drinks commonly consumed. This implies that the gender of the respondents did not significantly affect their opinions on each item. This implies that gender does not influence food choices. This could be traced to the children's family eating life style. This affirms Olabisi (2013) that food choices and intake can be associated with factors such as family upbringing, social interaction, customs and taboos, weather and climate, the types of food produced within the locality, health of the individual, economic status, education, religion and emotional feeling.

5. Conclusion

On the basis of the findings, it could be deduced that respondents often consume sweetened drinks while whole fruits were not often consumed. This implies that the pupils consume less of whole fruits with more of sweetened drinks which might influence their nutritional status. Body Mass Index (BMI) of the male and female pupils shows that majority of the pupils have normal weight (50% girls and 40% boys), followed by underweight (20% girls and 18% boys), for the pre-obese pupils, (17% are girls and 20% boys), Obese pupils were 13% girls and 22% boys. Furthermore, there is no significant difference in the influence of sweetened drinks and beverages consumption on the nutritional status of the male and female pupils. School aged children are particularly vulnerable to the nutritional effects of poor feeding practices and associated cognitive, behavioural and academic outcomes. Hence, there is a need for the pupils to adopt good feeding practices such as choosing healthy drinks.

6. Recommendations

Based on the findings above, it was recommended among others that;

- Nutrition Education should be integrated into the curriculum of primary schools.
- Parents and guardians should ensure that their children go to school daily with foods and healthy drinks in their lunch boxes.
- Parents should encourage their children to engage in healthy feeding practices such as choosing healthy drinks.
- Pupils should be taught to choose wisely when buying drinks and beverages outside the home.
- Parents should monitor the kinds of beverages / drinks their children take by spending time with them and eating healthily too so that their children can emulate them.

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