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Breakfast, Food Consumption Pattern and Nutritional Status of Students in Public Secondary Schools in Kwara State, Nigeria

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Abstract: Breakfast as the first meal of the day is one of the most skipped meals by adolescent students. Several research studies indicated that unhealthy food consumption and breakfast skipping contribute to low glycaemic level, poor cognition and academic performance as well as increasing prevalence of poor nutritional status among children (5-19) years. This study determined prevalence of breakfast and food consumption pattern and nutritional status of students in public secondary schools. This study's design was cross-sectional and multistage random sampling was used to select 515 participants, (343 girls and 172 boys) from 8 public secondary schools in study area. Self-reported 24 h recall dietary questionnaire was used to collect data on breakfast and food consumption of participants. Digital bathroom scale and stadiometer were used to collect data on weight and height of participants. Data were cleaned, coded and analyzed using (SPSS Version 20) and WHO anthroplus software. Results indicated that 54.0% of participants were (15/6-18/5) years/months, 77% consumed breakfast daily and 52% added (1-2) teaspoons of sugar daily to beverages. Furthermore, participants mostly consumed refined carbohydrates such as doughnut and biscuits (2.36±0.99 times per week), while mostly consumed fat and oil such as vegetable oil in soup (2.54±0.96 times per week), mostly consumed snacks such as fish pies and fish rolls (2.71±0.87 times per week), while mostly consumed protein such as eggs (2.15±0.69 times per week) and mostly consumed fruit such as pawpaw (2.56±0.89 times per week). Overall Nutritional status indicated that underweight was 29.1%, overweight was 4.7%, obesity was 0.2 and 66.0% were of normal weight. Furthermore, Nutritional status for both boys and girls indicated that underweight was (47.7 and 19.8%), overweight was (0.6 and 6.7%), obese was (0 and 0.3%) and normal weight was (51.7 and 73.2%), respectively. Relationship between food consumption and nutritional status of participants was positive but not significant ($r = 0.012$, $p = 0.785$). Analysis of variance showed positive significant relationship ($p = 0.001$) between food consumption and nutritional status. Despite that majority of participants consumed breakfast, the participants low frequency of food consumption is still of concern and this may influence their nutritional status negatively. Parents and other stakeholders should encourage breakfast consumption by participants as well as the consumption of nutritious food in order to meet their daily dietary allowance.

Key words: Breakfast, food consumption, nutritional status, public schools, adolescents

INTRODUCTION

Breakfast as the first meal of the day is expected to be consumed after seven to eight hours of sleep. It is the meal that keeps an individual alert and keep active to work for several hours in a day before lunch-break (Arora *et al.*, 2012; Matthys *et al.*, 2007; Reeves *et al.*, 2013). Skipping breakfasts is becoming prominent particularly among adolescent girls in secondary schools (Arora *et al.*, 2012; Hoyland *et al.*, 2012). Several studies on adolescent breakfast skipping attributed this phenomenon to lower socioeconomic status, food deprivation urbanization, long use of cell-phones and other electronic devices especially at night (Burghardt and Devaney, 1995; Hoyland *et al.*, 2012; Pereira *et al.*,

2011; Utter *et al.*, 2007). Adolescents and children are still dependants and they need adequate attention and care in order for them to be able to develop meals and food habits that are healthy and will promote good nutritional status (Lazzeri *et al.*, 2013; Nanney *et al.*, 2011; Storey *et al.*, 2011; Wate *et al.*, 2013). Skipping breakfast and unhealthy food consumption may lead to micro nutrients deficiencies and poor nutritional status (Acham *et al.*, 2012; Hallstrom *et al.*, 2013; Pereira *et al.*, 2011; So *et al.*, 2011). The consequences of poor nutritional status at the early stage of life may be so serious that it can result in depression, lack of self esteem, unconsciousness, anxiety, poor cognition and academic achievements and in extreme condition a

premature death among school children and adolescents (Acham *et al.*, 2012; Arora *et al.*, 2012; Bhurtun and Jeewon, 2013; Hoyland *et al.*, 2012; Matthys *et al.*, 2007; Pereira *et al.*, 2011; Utter *et al.*, 2007). Many research findings on adolescents in secondary schools reported low fruits and vegetables consumption, increasing snacks and soda drinks consumption, these were attributed to food environments such as inability of parents to eat breakfast with their children and food transition that most less developed countries like Nigeria are currently experiencing (Berge *et al.*, 2013; Feeley and Norris, 2014; Fleischhacker *et al.*, 2011; Fulkerson *et al.*, 2011; Giskes *et al.*, 2011; Popkin, 2011; Rodrigues *et al.*, 2012). Convenience foods that are mostly consumed by school going children are high in salt, saturated fats and low in essential micronutrients for children undergoing growth spurts (Faith *et al.*, 2011; Grimes *et al.*, 2013; Harel *et al.*, 2011; Larson *et al.*, 2011; Salvo *et al.*, 2012; Tavares *et al.*, 2012). Globally, the food transition and rapid changing in dietary consumption especially among countries in Africa and Asia have contributed to the increase in health challenges confronting those countries. The situation has shifted health challenges from infectious diseases to non communicable diseases particularly among African countries. The increase in the prevalent of diseases such as diabetes, elevated blood pressure, stroke, overweight and obesity, respiratory and cardiovascular diseases has been positively associated to unhealthy dietary consumption emanating from food transition (Briefel *et al.*, 2009; Gupta *et al.*, 2012; Hallstrom *et al.*, 2013; Kral *et al.*, 2011; Rampersaud *et al.*, 2005), this has contributed to poor health care delivery in developing countries. Majority of countries in Africa, Middle East and Asia continents have a larger proportion of population that is less than 40 years (Baldwin and Amati, 2012). Therefore, the need to appraise the breakfast and food consumption pattern of adolescents in public secondary schools is very essential in order to tackle this emerging health situation. Finding of this study will guide parents, caregivers and education ministries to develop new policy framework or adjust existing policy framework to meet the current food and health situations in our public schools.

MATERIALS AND METHODS

Cross-sectional analytical design was used, participants were selected using multistage random sampling and stratified sampling was used to stratify the participants into males and females (174 male and 343 females). A 24 h recall and Food Frequency Questionnaire (FFQ) adopted from a (FFQ) designed for older children and adolescents (Lee and Nieman, 2010) were used to collect data on food consumption pattern of participants. Stadiometer and digital scale were

used to measure height and weight of participants two times each and mean height and weight were determined. Two trained professional research assistants were used to conduct this study. Anthroplus software designed by (WHO) was used to determine the body mass index (BMI) and the nutritional status of participants was classified according to WHO (2007) classification. Data from (FFQ) was analyzed using statistical package for the social sciences (SPSS) to determine food consumption pattern of participants and mean (BMI). Food consumption patterns (FCP) was calculated as a composite score of 20 food items selected based on the energy density of such food and their influence on participants nutritional status. A score of 80, meant that all 20 foods were consumed in 5 or more times in a week. A score of 20 is the minimum, meaning the student never consumed any of the 20 foods. Descriptive and inferential statistical analyses of the data were presented in tables, charts and graphs. The Pearson correlation (r) and analysis of Variance (ANOVA) were used to determine the relationship and significant differences of the composite means between dependent (nutritional status) and independent variables (breakfast and food consumption pattern) at $p < 0.05$ for significant differences, respectively. Logistical and ethical considerations were dully observed.

RESULTS AND DISCUSSION

Demographic characteristics of participants: Sex ratio of Participants indicated that female participants were two times male participants and a higher proportion of participants were between 15 years and 6 months to 18 years and 5 months. Also many participants came from mixed public secondary schools. The above information could influence their breakfast and food consumption because many of the participants might have developed food habits that suit them (Table 1).

A higher percentage of participants walked to school daily and about a half of them lived with their parents, this may have influenced their breakfast, food consumption and nutritional status (Table 2).

Majority of parents and guardians of participants had acquired education up to primary level and also engaged in farming as their main occupation; this may have influenced the breakfast and food consumption of participants because most of the parents and guardians belong to lower socioeconomic status (Table 3).

Breakfast consumption by the participants: The breakfast meal consumption of participants showed that, 77% usually ate breakfast before going to school daily while 23% skipped breakfast, this could influence participants nutritional status (Fig. 1).

Table 1: Demographic characteristics of participants

Participants characteristics (n = 515)	No. of participants	Percentage of participants
Sex		
Male	172	33.4
Female	343	66.6
Total	515	100%
Age distribution (years/months)		
9.6-12.5	26	5.0
12.6-15.5	162	31.5
15.6-18.5	278	54.0
18.6-19.5	49	9.5
Total	515	100%
Type of school		
Boys	1	12.5
Girls	1	12.5
Mixed	6	75.0
Total	8	100%

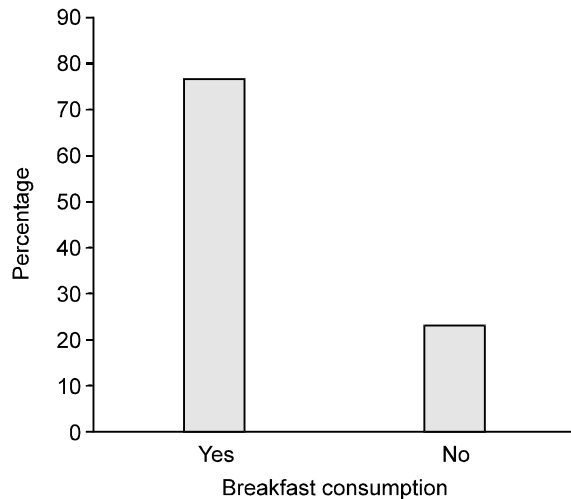


Fig. 1: Breakfast consumption by the participants

Daily sugar intake by the participants: The results of daily sugar intake of the participants indicated that 52% added 1-2 teaspoons of sugar to their beverages daily and 4.5% added 5 or more teaspoons of sugar, this indicates the pattern of sugar consumption of participants (Fig. 2).

Carbohydrates consumption by participants: Carbohydrate foods consumption of participants indicated that snacks, doughnut and biscuits, boiled bran rice and boiled sweet potatoes were among the highest mean composite consumption per week (Table 4).

Fat and oil consumption by participants: Fat and oil foods consumption of participants indicated that vegetable oil (soup), peanut butter and soy bean cheese were among the highest mean composite consumption per week (Table 5).

Protein consumption by participants: Fatty proteins consumption of participants indicated that fried/boiled eggs, ice-cream/yogurt and whole/milk shakes were among the highest mean composite consumption per week (Table 6).

Sugary, fruit juices and whole fruits consumption by participants: Sugary beverages, juices and whole fruits consumption of participants indicated that fruits such as pawpaw, mangoes and banana were among the fruits with highest mean composite consumption per week while soda/soft drinks were the highest sugary beverages consumed (Table 7).

Summary of nutritional status of participants: Participants nutritional status indicated that more male were underweight than female and more female had normal weight than male. The results further showed that more female were overweight and obese more than male and mean body mass index for all participants was 19.76 ± 2.62 (Table 8).

Relationship of food consumption and nutritional status of participants: Relationship between participants food consumption pattern and nutritional status was weak and of no significance (Table 9).

Analysis of variance of food consumption pattern and nutritional status of participants: Analysis of Variance (ANOVA) of nutritional status for categories of participants and the mean composite score for food consumption pattern showed that there was a significant association between the categories and mean composite score for food consumption pattern (Table 10).

Findings on demographic characteristics of participants indicate that majority of them were female and higher proportion of them were between 15 years and 6 months to 18 years and 5 months, many of them were from mixed public secondary schools. Furthermore, about half of the participants lived with their parents, while majority of the parents and guardians of participants acquired primary level of education and engaged in farming as occupation (Table 1-3). These findings agreed with similar study on adolescents breakfast and dietary consumption conducted by Olubanji *et al.* (2011), where it was discovered that majority of participants in the study were 15-19 years old and were from mixed schools. In addition, majority of participants lived with their parents. This clearly illustrates that majority of participants in this study might have established their breakfast and food consumption habits over a period of time, since the participants must have been going to school for more than 3 years. The

Table 2: Demographic characteristics of participants

Participants characteristic	No. of participants	Percentage of participants
Participants means of transportation to school		
Motorcycles	119	23.1
Public transport	26	5.1
Walked	318	61.7
Parents/guardians or cars	52	10.1
Total	515	100%
Participants by whom they lived with		
Parents	259	50.3
Guardians	123	23.9
Alone	133	25.8
Total	515	100%

Table 3: Demographic characteristics of parents or guardians of participants

Participants characteristic	No. of participants	Percentage of participants
Educational background of participant's parents/guardians		
None	6	1.2
Primary	320	62.1
Secondary	105	20.4
University	59	11.5
Others	25	4.9
Total	515	100%
Occupation of participant's parents/guardians		
Civil servants	17	3.3
Artisan	36	7.0
Farmers	351	68.1
Business activities	111	21.6
Total	515	100%

Table 4: Average numbers of times per week carbohydrates foods consumed by the participants

----- Starchy roots, tubers and refined cereals consumption (n = 515) -----						
Food items consumed	Never	1-2 times	3-4 times	5 or more times	Percentage total	Average No. of times per week
Boiled yam/cassava	21.9	52.0	14.8	11.3	100	2.15±0.89
Boiled Irish potatoes	42.9	40.0	13.6	3.5	100	1.78±0.81
Boiled sweet potatoes	26.0	40.4	22.3	11.3	100	2.19±0.95
Boiled bran rice	16.9	45.8	22.3	15.0	100	2.35±0.93
Maize boiled/roasted	38.4	32.8	24.1	4.7	100	1.95±0.90
Oat bran meal	22.1	51.7	20.4	5.8	100	2.09±0.81
Doughnuts and biscuits	23.3	28.2	40.0	8.5	100	2.36±0.99
Snacks	5.8	38.3	34.6	21.4	100	2.71±0.87
Spaghettis and noodles	24.3	43.3	26.4	6.0	100	2.14±0.85

Table 5: Average numbers of times per week fat and oil foods consumed by the participants

----- Fat and oil rich foods consumption (n = 515) -----						
Food items consumed	Never	1-2 times	3-4 times	5 or more times	Percentage total	Average No. of times per week
Peanut butter	28.7	34.0	11.5	25.8	100	2.34±1.15
Vegetable oil (soup)	15.7	31.8	34.4	18.1	100	2.54±0.96
Butter/margarine	29.5	45.0	20.6	4.9	100	2.0±0.83
Salad dressing/mayonnaise	33.8	42.7	18.6	4.9	100	1.94±0.85
Boiled/roasted peanut groundnut	42.3	21.9	24.5	11.3	100	2.04±1.06
Soybeans cheese	29.9	31.8	22.1	16.1	100	2.24±1.05

established breakfast and food consumption by the participants may have influenced their nutritional status in a certain manner. Improved breakfast consumption has been associated with presence of at least one of the parents (Hallstrom *et al.*, 2011; Hoyland *et al.*, 2012; Merten *et al.*, 2009; Tin *et al.*, 2011) and since majority of participants lived with parents, this may also influence

their nutritional status. Higher proportion of parents and guardians of participants had acquired primary level of education and mainly engaged in farming as their occupation. Lower level of education and unskilled occupation such as farming could limit the ability of parents to provide regular quality breakfast and could also influence food consumption of participants both in

Table 6: Average numbers of times per week fatty protein foods consumed by participants

Fatty proteins foods consumption (n = 515)						
Food items	Never	1-2 times	3-4 times	5 or more times	Percentage total	Average No. of times per week
Fried fish/roasted meat	40.2	39.6	10.3	9.9	100	1.89±0.94
Whole milk/milk shakes	18.6	57.9	20.8	2.7	100	2.08±0.71
Burgers/hot dogs	41.0	25.6	18.6	14.8	100	2.07±1.09
Pork/bacon	48.5	22.5	22.5	6.4	100	1.86±0.98
Ice-cream/frozen yogurt	13.8	68.9	10.1	7.2	100	2.10±0.72
Fried eggs/boiled eggs	11.8	65.4	17.7	5.0	100	2.15±0.69

Table 7: Average number of times per week sugary beverages, fruit juices and whole fruits consumed by participants

Sugary beverages, fruits juices and whole fruits consumption (n = 515)						
Food items consumed	Never	1-2 times	3-4 times	5 or more times	Percentage total	Average No. of times per week
Soda drinks / soft drinks	32.4	36.9	14.2	16.5	100	2.14±1.05
Chocolate drinks	28.7	48.9	22.4	0.00	100	1.93±0.71
Malted drinks	36.3	46.8	14.2	2.7	100	1.83±0.77
banana	8.2	56.5	29.7	5.6	100	2.32±0.71
mangoes	13.6	41.0	41.0	4.5	100	2.36±0.77
Pawpaw	8.9	43.5	29.3	18.3	100	2.56±0.89
Other fruits	21.2	48.8	13.7	16.3	100	2.23±0.99

Table 8: Summary of nutritional status of participants

Nutritional status (BMI for age)	Categories of weight status	Male participants n = 172		Female participants n = 343		Total participants n = 515		Mean (BMI) for age of all the participants (kg/m ²)
		n	%	n	%	n	%	
<15th percentile	Underweight	82	47.7%	68	19.8%	150	29.1%	19.76±2.62
15-84.5th percentile	Normal weight	89	51.7%	251	73.2%	340	66.0%	
85-97th percentile	Overweight	1	0.6%	23	6.7%	24	4.7%	
>97th percentile	Obese	0	0%	1	0.3%	1	0.2%	
Total		172	100%	343	100%	515	100%	

*BMI for age in (kg/m²) was calculated to give the mean BMI for age

Table 9: Relationship between food consumption pattern and nutritional status of the participants

Variables	p-value	Coefficient of correlation (r)
Food consumption pattern (FCP) and Nutritional status	p = 0.785	0.012

Table 10: ANOVA test of FCP and nutritional status of the participants

Body mass index (BMI) For age categories	No. of participants n = 515	Mean composite scores for (FCP)
Underweight	150	61.36±11.44 ^a
Normal weight	340	65.84±11.64 ^b
Overweight	25	70.24±9.58 ^c
p-value (ANOVA)	515	p = 0.001

Scores with different letters varied significantly with nutritional status (BMI for age categories)

school and at home and this could contribute to participant's present nutritional status. However, findings on demography characteristic disagree with similar study conducted by Musaiger *et al.* (2011). This may be due to difference in study area, study design, methodology and parents socioeconomic status.

Findings on breakfast consumption of participants indicate that almost a three quarter of them ate breakfast daily (Fig. 1). This finding agrees with a similar study on adolescent breakfast consumption and weight status conducted by Hoyland *et al.* (2012), the finding indicated

that 86% of participants ate breakfast. However, the finding of this study on breakfast was in contrast to another similar study conducted by Musaiger *et al.* (2011), in which it was reported that only-37.2% girls and 62.8% boys adolescents ate breakfast. Breakfast consumption of participants is fairly healthy and this may positively influence their nutritional status and reduce the prevalence of overweight and obesity.

Findings on participant food consumption pattern indicate that about a half of them added 1-2 teaspoon of sugar to beverages daily (Fig. 2), this finding is in line with a similar study conducted by Bhurtun and Jeewon (2013). Also the finding on other food items selected for this study reveals that carbohydrates, fats and oil, protein, fruits and other beverages consumption were consumed in less than three times per week by the participants. This finding agrees with other findings from similar studies published by several researchers (Arora *et al.*, 2012; Lazzeri *et al.*, 2013; Utter *et al.*, 2007) who stated that consumption of some foods was less than three times per week. However, a few studies disagree

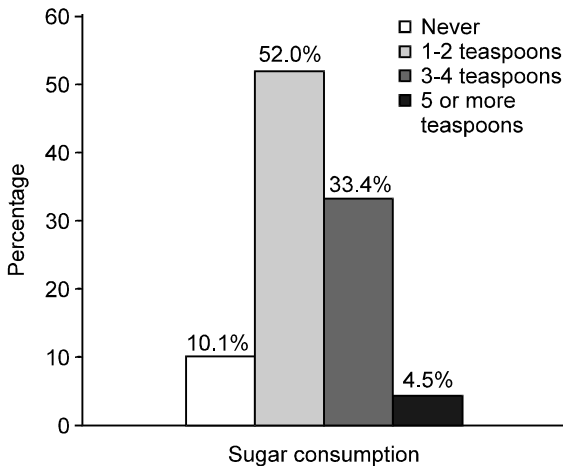


Fig. 2: Daily sugar consumption by participants

with the findings of this study, meaning that breakfast and food consumption among adolescent students in public school may be contextual and have other underlying factors. Generally, frequency of food consumption highlighted in this study is low (Table 4-7); this situation could have contributed to relatively reduced body mass index (BMI) of participants and lower prevalence of overweight and obesity (Onyiriuka *et al.*, 2013) (Table 8). Of concern also is the proportion of underweight among the participants which shows that some of the participants need to modify their food consumption in order to meet their present physiological state. Current nutritional status of participants could have been influenced by their parents and guardians socioeconomic status which is considered to be at the lowest stratum due to low education level and occupation. However, there is a significant association between the categories of nutritional status and their food consumption pattern of participants, this means that those with higher nutritional status tend to consume more frequently than those with lower nutritional status (Table 10).

Conclusions: Prevalence of breakfast consumption of the participants is appreciably higher compared to other studies, but the frequency of consumption of certain foods such as proteins and carbohydrates and also fruits are very low. This may result in poor nutritional status of participants in due course. Therefore, parents and caregivers and policy makers at the education ministries should encourage participants to consume more of nutritious foods particularly fruits and vegetables and proteinous foods per week.

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