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ORIGINAL ARTICLE

Dietary Intake and Nutritional Status of School-Children in Umudike, South-East Nigeria during Covid-19 Context

Paul Ndubuisi Anyiam[1]*, Chinedu P. Nwuke[1], Goodluck Chibuikem Adimuko[1], Precious Chinaza Uche[2], Elizabeth Adaeze Ukpai[1], Emmanuel C Ononogbu[3]

1. Department of Biochemistry, College of Natural Science, Michael Okpara University of Agriculture Umudike, Umuahia, Abia State, Nigeria
2. Department of Human Nutrition and Dietetics, College of Applied Food Sciences and Tourism Michael Okpara University of Agriculture, Umudike, Umuahia, Abia State, Nigeria
3. Department of Biostatistics, Faculty of Agronomic Sciences, Abomey Calavi University, Cotonou, Benin Republic

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**Corresponding author:*
Paul Ndubuisi Anyiam, PhD;
Department of Biochemistry,
College of Natural Science,
Michael Okpara University of
Agriculture Umudike, PMB 7267,
Umuahia, Abia State, Nigeria.
Tel: +2347065622725
Email: anyiam.paul@mouau.edu.ng
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ABSTRACT

Background: COVID-19 pandemic has caused disruption to food security in many countries including Nigeria. However, the impact of this on nutritional status of children is unknown. This study was designed to assess the dietary intake and nutritional status of school-aged children in Umudike, Nigeria within the context of COVID-19.

Methods: In this community-based cross-sectional study, the nutrient intake and status of 384 school-children (6-12 years) were studied. Socio-demographic characteristics were obtained using interviewer-administered questionnaire. Dietary intake data were collected using a pretested food frequency questionnaire and multi-pass 24 h dietary recall. The nutrient contents in foods were obtained using Nigerian food composition table. Anthropometrics were measured and wasting, overweight and obesity were defined using standard protocol.

Results: Totally, 70.5% of children consumed starchy tubers frequently. Animal proteins and fruits were infrequently consumed. Diets of 64.0% of children interviewed were characterized by a higher intake of energy above the recommended nutrient intakes (RNIs), while protein intake was below recommendations in 61.4%. Compared to RNIs, majority of the children had inadequate intakes of calcium (70.1%), iron (69.3%) and vitamins C (60.4%) indicating micronutrient inadequacies. Also, 38.3% of children skipped breakfast, while 49.5% replaced lunch with snacks and 14.06% of the children were wasted, and 16.18% were overweight, while 12.36% were obese.

Conclusion: It is therefore plausible that overconsumption of nutrient-poor diets and snacks contributed to the poor nutritional status of the children. There is need for intervention programs to address the problem and improve child nutrition in COVID-19 context.

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Introduction

The availability and access to affordable nutritious food has often been a challenge especially in many poor rural settings due to high prevalence of food crisis and poverty (1). In March 2020, the Nigeria government implemented restrictions to reduce the spread of COVID-19 in the country, in line with the guidance from the World Health Organization. The restrictions included social distancing, boarder closers, movement restrictions and closer of non-essential services within the country for over a year. These restrictions are likely to have caused unintended effects on food access and availability through the disruption of food systems; thereby worsening the pre-existing food crisis in the region (1, 2) and significantly increasing the levels of poverty including loss of jobs (3, 4).

According to World Bank (5) forecast, the COVID-19 crisis will result in an additional 10.9 million Nigerians entering into poverty by 2025. The high cost of foods and low affordability among low–income households also mean billions cannot eat healthy balanced diets that are age appropriate. With more people falling into poverty as a result, it will be difficult for many families to afford a variety of nutritious foods for their children (6, 7). This means more children consuming cheaper unhealthy foods and poor nutrition can have a devastating impact in the growth and development of the children (8). As a result, there could be an upsurge of malnutrition and nutritional abnormalities (stunting, underweight and overweight) in children due to sharp declines in household incomes (9), high cost of foods (3, 4) and interruptions to nutrition services (10). This aspect is especially relevant from a public health point of view, because poor dietary habits and obesity which have been established in childhood may track into adult life (11).

Children are vulnerable to malnutrition and thus a group of interest to follow up whether their meals meet the recommended guidelines or not. Improving the nutritional intake of children is therefore a goal for global public health (8). Therefore, regular monitoring of nutrition and dietary behavior for these age groups are necessary (12), to help address the problems of malnutrition. It is obvious that the COVID-19 pandemic has caused disruption to food security in many countries, including Nigeria. While rapid analyses have been conducted to estimate the economic effects of the pandemic on families (5, 9), the impact it has on the dietary intake and nutritional status of children in Nigeria is currently unknown which has become a barrier in addressing malnutrition and associated risks in children during the pandemic. In this report, we aimed to present the current situation of food intake, dietary pattern and nutritional status of school children within the context of COVID-19 pandemic. The findings from this study may assist in decisions making and evaluations in the field of nutrition and health policy at national and international level.

Materials and Methods

Umudike (5°28'33"N, 7.32'56"E) is a small settlement in Ikwuano Local Government Area of Abia Sate in South Eastern Nigeria. It is home to the Michael Okpara University of Agriculture and the National Root Crops Research Institute. The majority of the population economy depends on traditional agriculture and the main crop produced in the area is cassava, in which the people largely are dependent on as a source of livelihood; which also provides their staple food. The community can be classified as a low income socio-economic status group which typifies the average Nigerian experience and hence it is purposively chosen as setting for this study. The study was conducted at a time marked by food scarcity and high cost of foods items presumably brought about by the measures to contain COVID-19 outbreak. Planting season was over, but harvest time was coming.

Children aged 6-12 years from the public primary schools within Umudike community, Nigeria were potentially eligible for inclusion in this study. Written permission to conduct the study was obtained from the participating schools. Thereafter, the parents/legal guardians of the children were written asked for permission to recruit their children in the study. Only children whose parents/legal guardians consented to their participation were eventually allowed to participate in the study. Other inclusion criteria for the study were; absence of any signs of overt illness, non-use of any prescription drugs and residency within the study area. The sample size used for the study was calculated using the formula described before (13) as $n=[Z^2P(100-P)]/x^2$. Where "Z" represents the acceptable margin error of 1.96 (~2) for sample size (n) greater than 30 at 95% confidence interval, "P" represents the percentage of children assumed to have poor nutritional status in the region, which was taken to be 60% at maximum "100-P" represents the percentage of children assumed to have good nutritional status; X=Width of confidence interval taken to be 5% and n=Sample size. This gave the sample size of 384. Therefore, a total of 384 school-age children were included. No honoraria were paid to participants.

Community based cross-sectional study design was employed using quantitative approach that involves 384 school children aged 6 to 12 years

old. The children were interviewed face-to-face at home about their food intake with the aid of their parents/caregiver. The data collection tools at homes utilizing the food frequency questionnaire (FFQ) and a multi-pass 24 h dietary recall. Data on child's age was obtained from their school records. The socio-demographic characteristics were obtained using an interviewer-administered questionnaire. A standard interview protocol was used at every home visited to ensure that all interviews are conducted in similar manner. The Helsinki declaration was strictly followed and the Research Ethics Committee of the College of Natural Science, Michael Okpara University of Agriculture, Umudike, approved the design and protocol for this study (MOU/CREC/001/21).

The 24 h dietary recalls were completed on three separate days (two week-days, and one weekend) in the course of two weeks. Parents/caretaker provided information about all foods that their child had consumed in the previous 24-h period preceding the interview. The parents/caretakers were also asked to report the exact recipes for the homemade foods. Food frequency Questionnaire (FFQ) was used to determine frequency of consumption of different foods groups in the households. The respondents were asked to report the number of times that they consumed food from each of the food groups listed in the FFQ in the past one week in order to derive more habitual intake. Response options were: daily, 4-6 times per week, less than three times per week, and never (14). Prior to the study, selected households within the study area were visited 3 times per week for 2 weeks (including weekend days) with a digital weighing balance to obtain the quantity of respective foods served to their children during breakfast, lunch and dinner. Average portion size for same food was used during the main study to calculate the total nutrient intakes from each food type. The process involves four steps as previously described (15): (i) For each child, an empty clean plate was weighed, (ii) Food was added to the weighed plate and the weight retaken and recorded, (iii) The children were served the food to eat and after eating, the remaining leftover in the plate were re-weighed, and (iv) The weight of the remaining leftover food after consumption was subtracted from the quantity served to each child to obtain the actual quantity of food eaten.

The mean quantity (g/day) of each food item was calculated for each child and the Nigerian Food Composition Table (16), which contains the composition in 28 nutrients of about 282 different foods consumed in Nigeria were then used to calculate the mean daily nutrient intakes from each food eaten. When a food product was not available in Nigerian Food composition table, the West African Food Composition database (17) was used to calculate the mean daily intakes using the expression described by Ayogu *et al*. (18). These were compared to nutrient and energy intake recommendations as outlined in the joint FAO/WHO (19) report and each child was identified as having below, within or above the recommended intakes for their age category.

The anthropometric characteristics of the child were measured at school. Child height and weight were collected using an inelastic measuring tape, fastened to a vertical rod, to the nearest 0.1 cm, with the subject standing on bare feet. Children were weighed in their school uniforms with shoes removed using a digital display electronic scale (BF 214, OMRON Healthcare Europe) to the nearest 0.1 kg. Same trained personnel took all measurements. Child height and weight were converted to weight for height Z score (WHZ) using the version 1.0.4 WHO AnthroPlus software (20). Children were classified as wasted if their WHZ were ≤−2SD, while overweight or obesity were defined as WHZ >2SD and >3SD, respectively

All data analysis was done using SPSS for windows (SPSS inc., version 16, Chicago. IL, USA). Descriptive statistics were performed on the data generated and their results reported as number and percentages for all categorical data. Differences between the categorical data were compared using the Fisher's exact test (2-sided) and the significant threshold was fixed at $p<0.05$. Results were presented in table and in graph respectively.

Results

Out of 384 children interviewed, 181 (47.13%) were male, while 203 (52.86%) were female (Table 1). The mean age of the male respondents was 10.54±2.07 years and the mean age of female respondents was 8.34±3.13 years. Only 20.81% of the respondents' household heads had achieved tertiary education, while 14.02% had no formal education. The majority (89.84%) of the respondents lived with their parents. Very few (10.15%) lived with a guardian. Only 8.59% of the household head were unemployed. Table 2 shows that the majority of the participants (70.5%) frequently consumed food from the cereals and tubers group. Also soft drinks, sweets and snacks were frequently consumed by 78.12% of the school children, while a larger proportion infrequently consumed fruits (65.8%), vegetables (26.0%) and milk (58.6%) from the studied population. The dietary pattern of the participant was presented in Table 3.

Table 1: Socio-demographic characteristics of respondents.

Variable	N=384	N	%
Gender	Male	181	47.13
	Female	203	52.62
Age range	6-9	174	45.31
	10-12	210	54.68
Educational level of household head	No formal education	54	14.02
	Primary	116	30.19
	Secondary	134	34.83
	Tertiary	80	20.81
Occupation of father	Unemployed	33	8.59
	Artisan	114	29.62
	Civil servant	46	11.91
	Trader/business	138	35.90
	Farmer	53	13.81
Occupation of mother	Unemployed/housewife	64	16.59
	Trader/business	124	32.29
	Civil servant	37	9.61
	Artisan	112	29.18
	Famer	47	12.22
Mode of living	Living with parents	345	89.84
	Living with guardian	39	10.15
Family setting	Monogamous	288	75.0
	Polygamous	96	25.0

N=no. of respondents

Table 2: Frequency of composition from each food group irrespective of gender and age.

Food group	Frequent consumption			Infrequent consumption			
	Daily N (%)	4-6x/wk N (%)	Total N (%)	<3x/wk N (%)	OC N (%)	Never N (%)	Total N (%)
Roots/Tubers	184 (47.9)	111 (28.9)	295 (77)	86 (22.3)	3 (0.78)	0.0	89 (23.1)
Legumes	74 (19.27)	112 (29.2)	186 (48.4)	136 (35.4)	62 (16.1)	0.0	198 (51.5)
Cereals	77 (20.1)	194 (50.5)	271 (70.5)	89 (23.2)	24 (6.3)	0.0	113 (29.4)
Milk/Milk products	86 (22.39)	71 (18.4)	157 (40.8)	193 (50.2)	34 (8.8)	0.0	227 (59.1)
Meat/Fish/Poultry	89 (23.1)	98 (25.5)	187 (48.7)	167 (43.4)	30 (7.8)	0.0	197 (51.3)
Fruits	33 (8.6)	98 (25.5)	131 (34.1)	191 (49.7)	51 (13.3)	11(2.8)	253 (65.8)
Vegetables	113 (29.4)	171 (44.5)	284 (73)	98 (25.52)	2 (0.52)	0.0	100 (26.0)
Nuts and seeds	54 (14.0)	86 (22.4)	140 (36.4)	146 (38.0)	70 (18.2)	28 (7.3)	244 (63.5)
Soft drinks/Snacks	184 (47.9)	116 (30.2)	300 (78.2)	67 (17.4)	17 (4.42)	0.0	84 (21.8)

Data were presented as number and percentages. OC=Occasionally. N=no. of respondents.

Table 3: Dietary pattern of the children expressed by gender.

Dietary pattern	Yes/No	Male (n=181)	Female (n=203)	Total (n=384)	*p* value
Breakfast	YES	122 (67.4)	115 (56.7)	237 (61.7)	0.001*
	NO	59 (32.6)	88 (43.3)	147 (38.3)	0.028*
Lunch	YES	82 (45.3)	94 (46.3)	176 (45.8)	0.624
	NO	99 (54.6)	109 (53.7)	208 (54.2)	0.565
Afternoon	YES	88 (48.6)	102 (50.2)	190 (49.5)	0.899
snack	NO	93 (51.4)	101 (49.7)	194 (50.5)	0.771
Dinner	YES	132 (72.9)	169 (83.3)	301 (78.4)	0.049*
	NO	49 (27.1)	34 (16.7)	83 (21.6)	0.033*
Evening	YES	37 (20.4)	32 (15.7)	68 (17.7)	0.028*
snack	NO	144 (79.5)	171 (84.2)	315 (82.0)	0.055

Data were presented as number and percentages. *P values <0.05 were considered statistically significant (Fisher's exact test).

It was observed that two third of the children (65.5%) had breakfast, close to half of the study population (46.9%) consumed lunch, while 34% replaced lunch with snacks. The majority had dinner (73.7%), while 34.2% took snacks as dinner. The proportion of females who skipped breakfast was significantly (p<0.05) higher (39.6%) than males (29.5%). Table 4 shows the amount of nutrients available from each of the commonly consumed foods. Highest carbohydrate contribution (81.89 g/100 g) was obtained from *Garri* followed by *Fufu* (64.74 g/100 g) while the least carbohydrate intake (1.2 g/100 g) was obtained from fish. Others fell within this range. Highest protein intake was contributed by fish (25.1 g/100 g) followed by beans (21.2 g/100 g). Garri contributed the highest energy value (1508.4 kj), while pap (fermented maize beverage) gave the least energy level (200.7 kj). The total daily nutrient intake in reference to the average RNI values for each age category (6-9 and 10-12) was represented in Table 5.

The total energy intake was higher than

Table 4: Nutrients/Energy intakes in commonly consumed foods per 100 g.

Food	Water (g/ 100 g)	PT (g/ 100 g	Ash (g/ 100 g)	Cho (g/ 100 g)	Fat (g/ 100 g)	Fibre (g/ 100 g)	Fe (mg/ 100 g)	Ca (mg/ 100 g)	Zn (mg/ 100 g)	Vit.C (mg/ 100 g)	Vit.B1 (mg/ 100 g)	Energy (kj)
WB	32.2	8.32	1.84	51.76	4.01	2.67	3.26	89.84	1.58	0.00	0.30	1156.7
Fufu	44.4	1.52	0.77	64.74	0.08	1.36	0.83	14.97	0.34	21.2	0.04	593.26
Garri	12.6	2.60	2.29	81.89	1.72	1.37	1.17	56.05	2.50	28.3	0.08	1508.4
Pap	89.2	1.04	0.09	10.82	0.06	0.50	0.18	1.85	0.24	3.82	0.19	200.79
JR	60.2	3.0	3.2	26.6	7.7	0.2	0.8	14.08	1.07	17.0	0.03	785.52
WR	66.2	2.6	0.3	30.1	0.2	0.5	0.73	4.20	0.64	0.0	0.01	554.93
ES	57.0	5.5	5.0	21.0	15.0	2.0	2.7	83.4	0.3	8.4	0.03	1008.58
TS	50.2	7.0	4.7	28.2	6.0	3.9	0.8	65.8	0.5	5.8	0.16	421.84
OHA	85.3	3.8	3.0	5.6	2.4	2.1	2.2	74.6	3.2	14.5	0.80	359.9
ONU	79.0	5.30	1.0	7.1	1.0	5.4	3.4	181	2.2	22.2	0.09	245.24
Fish	71.2	25.1	1.1	1.2	2.6	0.6	3.6	15.0	2.2	5.81	0.15	537.40
Meat	54.1	17.5	0.9	0.0	27.9	0.00	2.8	18.0	0.16	0.00	0.03	1343.8
Yam	62.3	1.9	1.0	29.6	0.2	5.1	0.3	26.50	0.4	17.1	0.27	534.84
Bean	69.7	21.2	1.0	7.5	0.8	0.8	5.4	6.19	0.2	8.33	0.17	510.57

Cho=carbohydrates, WB=White bread, JR=Jollof rice, WR=White rice, ES=Egusi soup, ONU=Onugbu soup, TS=Tomato stew. Values were from Nigerian food composition table/Western Africa food composition database.

Table 5: Daily nutrient intake compared with recommended nutrient intakes (RNI).

Nutrient/RNI	RNI Status	6-9 y n (%)	10-12 y n (%)	Total n (%)	*p* value
Protein	Below	105 (60.3)	127 (60.4)	232 (60.4)	0.883
(27-34 g/day)	Above	29 (16.6)	53 (25.2)	82 (21.4)	0.044*
	Within	40 (22.9)	30 (14.3)	70 (18.2)	0.00*
Iron	Below	124 (71.3)	142 (67.6)	266 (69.3)	0.158
(14-16 mg/day)	Above	28 (16.1)	36 (17.1)	64 (16.7)	0.663
	Within	22 (12.6)	32 (15.2)	54 (14.1)	0.744
Calcium	Below	114 (65.5)	155 (73.8)	269 (70.1)	0.006*
(700-1300 mg/day)	Above	14 (8.0)	15 (7.1)	29 (7.6)	0.813
	Within	46 (26.4)	40 (19.0)	86 (22.4)	0.047*
Vitamin C	Below	96 (55.2)	136 (64.8)	232 (60.41)	0.004*
(35-40 mg/day)	Above	19 (10.9)	27 (12.9)	46 (11.97)	0.811
	Within	59 (33.9)	47 (22.4)	106 (27.60)	0.039*
Zn	Below	62 (35.6)	84 (40.0)	146 (38.0)	0.172
(5-9 mg/day)	Above	23 (13.2)	46 (21.9)	69 (17.96)	0.022*
	Within	89 (51.1)	80 (38.1)	169 (44.0)	0.001*
Energy	Below	19 (10.9)	56 (26.6)	75 (19.53)	0.016*
1950-2200	Above	131 (75.3)	115 (54.8)	246 (64.0)	0.000*
Kcal/day	Within	24 (13.8)	39 (18.6)	63 (16.4)	0.086

Data were presented as number and percentages. *P values <0.05 were considered statistically significant (Fisher's exact test).

recommended in 64% of the population. The consumption of protein was below the recommended intake in 60.5% of the children. Only small proportion of the children (18%) met the RNI for protein. The intake of iron was below the RNI in 69.3% of the children. Data presented in Figure 1 showed that 14.4% of males and 12.01% of female children were wasted. When data were pulled together irrespective of gender and age, as much as 16.18% and 12.36% of the studied population were overweight and obese, respectively. Therefore, the prevalence of abnormalities (i.e., wasting, overweight and obesity) from the studied population was high, but higher in males than females.

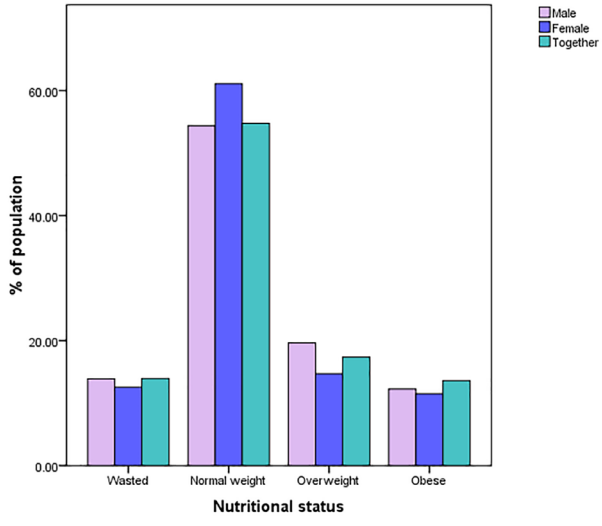

Figure 1: Nutritional status of children in COVID-19 context expressed by gender.

Discussion

From our finding, we found that most of the families we visited had to make some adjustments to the food they provided to their children either due to reduced household budgets and/or a rise in the cost of foods since the emergence of COVID-19 pandemic. Furthermore, while the studied populations were mostly of normal weight, we noticed that about two-third of the school children had daily nutrient intakes below the RNI for the selected nutrients studied. This is mainly a function of the observed small portion sizes and the quality of the foods served to the children. This implies that to meet the recommended daily requirements of these micronutrients, larger portion sizes of good quality foods must be served to the children. However, in the face of high cost of foods and food scarcity in the region, this is an illusion as poverty has been implicated in determining the quality of what is consumed at household level (21).

It was observed from the study that carbohydrate was the main source of energy from the food types consumed by the school-children. Though carbohydrate is necessary to provide readily available energy for school work and serves as source of energy for the cells in the body particularly the brain which is a glucose-dependent organ. It also ensures that protein is spared for the function of growth, repair and maintenance of body tissues, the intake of carbohydrate contributed above the recommended intakes in majority of the children (64.0 %). This is due to the frequent consumption of starchy-based tubers seen from the FFQ report. The value suggests the need to reduce the overdependence on starchy-based tubers and increase the consumption of protein and other micronutrients sources such as fruits and animal proteins, which are infrequently consumed.

Animal source foods are excellent sources of protein and minerals especially heme iron that are easily absorbed in the body (14). The present report showed that more than half of the children (51.3%) were seen to consume animal protein (meat, fish, and poultry) infrequently. As a result, majority of the children (60.4%) did not meet the daily recommendations for protein. This percentage is higher than previous reports in Nigeria (13, 15, 22, 23), which could be a reflection of the worsening effect of the COVID-19 measures on food availability and affordability in the region. Furthermore, the major protein sources of many of the children were observed to come from mainly plant sources (especially legumes such as bean). Such plant nutrients contains appreciable amount of anti-nutrients (14), including protease inhibitors which interferes with protein digestion by inhibiting the protein digestive enzymes (trypsin, pepsin and other gut proteases). This could partly explain why more than half of the children did not meet the protein requirements despite many children consuming leguminous food more frequently (14).

Micronutrients (minerals and vitamins) are chemical elements that are required in trace amounts for good health, normal growth and development of human and other organisms (12). From our findings, the iron intake of most of the school children falls below the RNI. Iron is an indispensable nutrient that is engaged in oxygen transport, energy metabolism, immune response and plays a vital role in brain and cognitive development (24, 25). Low intake of iron can contribute to anemia which indicates the vulnerability of this age group to the iron deficiencies. The frequent consumption of plant-based proteinous foods (e.g. legumes) seen in our report is capable of boosting the iron intakes of the children. But on the contrary, such proteins from plant sources contain non-heme iron with lower bioavailability (14).

The anti-nutrients (phytates, tannins and oxalates)

could interact and form insoluble complexes with the iron, thus reducing their absorption. This could explain why many children did not meet the RNI for iron as well. Furthermore, fruits and vegetables are excellent sources of minerals and vitamins, especially vitamin C that enhances the absorption of iron in the body. But, this report showed that majority of the children (65%) infrequently consumes fruits. This may be another reason why majority of the children did not meet the requirements for iron and other minerals in this study (14).

About two-third (70.1%) of the children studied did not meet the recommended intakes for calcium and more than one-third (38.0%) did not meet the RNI for Zinc in this study. Inability of the children to meet the recommendations for calcium could be attributable to the infrequent consumption of milk and milk products being the major sources of calcium for children. These values are higher than the values reported among school children in different settings in Nigeria before the pandemic (15, 22, 26). Low intake of calcium observed in this study is especially worrisome, since calcium is essential for child's bone growth (27). On the other hand, inadequate zinc intake is recognized to impair the immune system (24, 28).-

Common eating pattern seen from this study include replacing lunch with unhealthy snacks and skipping meals which is linked with over-eating (29). Such irregular meal patterns are associated with overweight/obesity (30). The dietary intake pattern observed among the children in this study indicates poor progress so far in addressing the high prevalence of nutritional deficiency among children in the region. The overall prevalence of abnormalities (i.e. wasting, overweight and obesity) in this study (14.06, 16.18 and 12.36%) is worrisome, since such abnormalities (especially obesity) often persist to adulthood which is more common in females (11, 31).

Earlier cross-sectional study in South-East, Nigeria before the emergence of COVID-19 using the same diagnostic tool as we used in this study reported an overweight prevalence of 3.9% in boys and 5.8% in girls and obesity prevalence of 0.3% in boys and 1.0% in girls (31). These figures are lower than values reported in this present report which may be an indication of poor nutritional status of the children, a reflection of the true economic situation at the time of COVID-19 pandemic. They are many other reports on the prevalence of obesity in children, but variations in sample characteristics and methodological differences make proper comparisons quite difficult. This increased rate of obesity among the children is not entirely surprising, since the population depends largely on starchy-based tubers (especially cassava) as their main staple.

High energy-dense diet and unhealthy snacks have a relevant impact on the development of overweight and obesity (31). In addition, the educational level and occupation of parents also had been linked with the nutritional status of children (32). About 14.02% of the household heads in this study had no formal education, while 8.59% were unemployed. It is therefore notable that the poor nutritional status of the children reported here may be driven by these socio-demographic factors including skipping meals and poor diets. These findings are worrisome because any child who suffers any form of malnutrition at younger age is prone to health problems, which might lead to poor cognitive development (7, 25). Stunted children are also observed to perform poorly at school which can reduce the prosperity of future generations (33).

The strengths of this study include the use of a recently updated Nigerian food composition database and the assurance of quality data analysis by passing it through different statisticians and results were compared. However, there are some limitations. Firstly, only school going children were included in the design; therefore, the results can be used in the population of school aged children and may not represent the general population. This therefore calls for a cautious interpretation and application of the data. Secondly, as the design of the study was cross-sectional, its ability to draw cause and effect relationship was limited. Finally, only the nutrient composition values of the commonly consumed foods were used to estimate the potential contribution to nutrient intake (RNI) in this study. The bioavailability factors were not considered in the calculations. However, despite these limitations, the results of this study will provide important contributions to the limited data available on the dietary intake and nutritional status of school children in Nigeria during COVID-19 pandemic

Conclusion

The results of the present study indicated a flawed food consumption pattern, poor dietary intakes and nutritional abnormalities among the school-children. This was a function of observed frequent consumption of cheaper energy-dense foods, unhealthy snacks and small serving quantity, consequently leading to the high rate of nutritional abnormalities (underweight, overweight and obesity) observed among the children. This could be a reflection of the worsening effect of the COVID-19 controlling measures on food availability and affordability in the study area. Hence, there is need for appropriate nutritional intervention programs to address the situation.

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Conflict of Interest

None declared.

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