

Consumption of Ultra-Processed Foods and Anthropometric Status of Adolescents in Umuahia North Local Government Area Abia State, Nigeria

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Received : March 31, 2024

Published : June 14, 2024

ABSTRACT

Background: Ultra-Processed Foods are packaged formulations manufactured entirely from substance derived from foods and several additives. They are characterized by fatty, sugary, salty or energy-dense compounds. They appear palatable to consumers because of addition of substances like colorings, flavorings, sweeteners and emulsifiers. **Objectives:** The objectives of the study were to assess the consumption of ultra-processed foods and anthropometric status of adolescents in Umuahia North L. G. A, Abia State. **Methods:** A community based cross-sectional study was conducted with 420 adolescents randomly selected from six wards out of the twelve wards in Umuahia North L.G.A. Data on socioeconomic/ demographic variables, anthropometric and food consumption were collected and analyzed using IBM statistical package for social sciences version 23. **Results:** The result showed that 51.4% of the adolescents studied were females, while 48.6% were males. About 64.0% of the adolescents were within the age range of 13-15years, while 30.2% were within the age range of 16-18years and 5.7% were above 19years. Instant noodles were consumed by 53.8% of the respondents sometimes. Most of the respondents (75.5%) consumed soft drinks from time to time. Packaged bread (50.0%), cakes (81.9%), and Breakfast cereals (62.5%), were consumed by the respondents from time to time. Some of them did not consume flavored yoghurt (22.1%), salted/sugar nuts (20.0%), hamburger (30.5%) and canned beer (31.2%). About 35.5% of the respondents were underweight. Underweight was more prevalent among females (39.8%), than males (31.1%). About 5.2% of the respondents were overweight, while 1.9% was obese. The Chi-square result show there was a significant relationship $p < 0.05$ between body mass index and consumption of candy, canned meat, canned vegetables, margarine/spreads, sausages and chips by the respondents. **Conclusion:** There was a moderate consumption of ultra-processed foods among the adolescents.

Some of respondents were on the borderline of overweight and obesity. There is need to increase awareness on the importance of consumption of wholesome and natural foods among adolescents.

Keywords: Anthropometric Status, Adolescents, Ultra-Processed Foods, Abia State, Nigeria

INTRODUCTION

The diets of adolescents are of public health concern due to the relationship between poor nutrition in childhood and nutrition related diseases in later life [1]. Ultra-processed foods are packaged formulations resulting from several successions of industrial processes. They are manufactured mostly or entirely from substances derived from foods e.g., sugar, fat, salt or additives used to imitate sensory properties of foods to disguise unpalatable aspects of the final products. They typically contain little or no intact foods [2]. Ultra-processed food and drink products include carbonated drinks, fruits and vegetable juice, energy drinks, breakfast cereals, sweet and salty/spicy snacks, ice creams, biscuits, spreads, sauces and ready meals, buns, candies, cookies, pastries, margarines and spreads, milk drinks, yoghurts, cocoa drinks, meat and chicken extracts, infant formulas and slimming products [3]. Compared with wholesome freshly cooked foods, ultra-processed products are higher in sugar, saturated fats and sodium and lower in dietary fiber, minerals and vitamins, and are more energy-dense [4]. In addition, they are convenient, heavily marketed, and formulated to be palatable and habit forming [5].

Adolescence is a period between the ages of 10 and 19 years, characterized by many physiological changes and formation of lifelong eating habits [6]. A dietary pattern is the general profile of food and nutrient consumption which is characterized on the basis of the usual eating habits. The analysis of dietary pattern gives a more comprehensive impression of the food consumption habits within a population [7]. Patterns of nutritional behaviors adopted in childhood and adolescence are mostly continued in adult life and increase the risk of development of many chronic diseases [8]. The transition from adolescence to adulthood is an important period for establishing behavioral patterns that affect long-term health and chronic disease risk [9]. Studies have shown that adolescents are particularly vulnerable to poor eating habits and are said to be in the habit of eating "junks" [10]. These poor eating habits may likely arise from lack of knowledge of the

cumulative effects of eating habits. There are many fast food centers in Umuahia where this survey was carried out; this is disturbing as it may be a contributor to the consumption of ultra-processed products by adolescents in the area. The aggressive marketing of these products challenge their conscious consumption and make them preferred substitutes for adolescents. There is a scarce literature relating to the consumption of ultra-processed foods in Nigeria. Thus this paper on the consumption of ultra-processed foods and anthropometric status of adolescents in Umuahia North Local Government Area, Abia State.

MATERIALS AND METHODS

Area of Study: The study was conducted in Umuahia North Local Government Area, Abia State. Umuahia North is a Local Government Area in Abia State with administrative headquarters in the city of Umuahia. The town is located within South-East agro-ecological zone of Nigeria, with a climate condition typical of the tropics. Umuahia North has a population of 220,660 people. The inhabitants are predominantly farmers, traders, civil servants, students, merchants. The inhabitants are Igbo's, and few people from other tribes like Yoruba, Hausa, and Cross Rivers. Umuahia North is made up of twelve electoral wards; Urban ward I, Urban ward II, Urban ward III, Ibeku East ward I, Ibeku East ward II, Ndume West ward, Nkwoachara ward, Nkwoegwu ward, Afugiri ward, Umuhu ward, and Isingwu ward, forty autonomous communities and three hundred and sixty three villages.

Population of the Study: The population of the study includes adolescents (10-19 years) in Umuahia North LGA, Abia State.

Sample size determination: The sample size (n) was determined using the equation

$$\text{Sample size } (n) = N/1+N (e)^2$$

n = Sample size, N = Total population size (220,660), e = precision or sampling error (0.05)

$$n = 220660/1+220660 (0.05)^2$$

$$n = 220660/1+220660 (0.0025)$$

$$n = 220660/551.6525$$

$$n = 399.9 \approx 400$$

Sample size was rounded up to 420 to make up for dropouts and incorrectly filled questionnaires.

Sampling Procedure: There are twelve wards, forty autonomous communities and three hundred and sixty three villages in Umuahia North LGA. From the twelve wards, five wards were selected using simple random sampling method by balloting. The selected wards were Urban ward I, Ibeku East ward I, Nkwoegwu ward and Isingwu ward. The second stage involved the random selection of five autonomous communities and three villages from each of the selected communities. A systematic random sampling was used to select one respondent from every 5th house in each village. Houses without adolescents were skipped to the next house with adolescents.

Informed Consent: Prior to the survey, a preliminary visit was made to the Local Government Chairman and leaders of the various communities and villages to inform them about the survey. Permission was sought to allow the researchers carry out data collection.

Data Collection: Data were collected using pretested, structured and validated questionnaires. The variables evaluated were socioeconomic characteristics, demographic characteristics and anthropometric measurements (weight and height). The consumption of ultra-processed foods by the adolescents was determined using a food frequency questionnaire.

Data and Statistical Analysis

Descriptive statistics, frequency, percentages and cross

tabulation were used to analyze background information and Socio-economic characteristics of the adolescents. The anthropometric data (weight and height) of the respondents was categorized using WHO Anthro Plus. Anthropometric indices were analyzed and compared to WHO standard. Chi-square was used to analyze the relationship between Socio-economic characteristics, Consumption pattern and Anthropometric status of the subjects. Significance was tested at $p < 0.05$. IBM statistical package for social sciences version 23.0 was used for the statistical analysis.

RESULTS

Table 1 shows the background and socio-economic characteristics of the respondents. A majority (64.0%) of the adolescents were within the ages of 13-15years, 30.3% were within the ages of 16-18years, while 5.7% were 19years of age. The respondents comprised mostly of females (51.4%), while 48.6% were males. Almost half of the respondents (47.9%) were in senior secondary school, and 36.0% were in junior secondary school. Almost all the adolescents (92.9%) were Christians, while about 7.1% being non-Christians. Majority of the respondents (49.8%) were from a family of 5-7persons, while 34.0% were from a family of 2-4 persons. Majority (82.4%) of the adolescents, were from the Igbo ethnic group, while 10% were of the Yoruba ethnic group and 5% from Hausa. Over a quarter (46.6%) of the respondents' parents attained Tertiary education, while 23.8% attained secondary education and 29.6% primary education. About 32.6% of the adolescents' parents earned between 61,000- 90,000 naira monthly, while 28.1% earned above 91,000 naira monthly.

Table 1. Background information and socio-economic characteristics of the adolescents

Variable	Frequency	Percentage
Age		
13-15years	269	64.0
16-18years	127	30.3
19years	24	5.7
Total	420	100
Gender		
Male	204	48.6
Female	216	51.4
Total	420	100
Class		
JS1-JS3	151	36.0
SS1-SS3	201	47.9
Undergraduate	68	16.1
Total	420	100
Religion		
Christianity	390	92.9
Others	30	7.1
Total	420	100
Household Size		
2-4persons	143	34.0
5-7persons	209	49.8
8-10persons	48	11.4
Above 10persons	20	4.8
Total	420	100
Ethnic group		
Igbo	346	82.4
Hausa	41	9.8
Yoruba	16	3.8
Others	17	4.0
Total	420	100
Parents' educational status		
Primary	124	29.6
Secondary	100	23.8
Tertiary	196	46.6
Total	420	100
Income per month		
Less than ₦30,000	82	19.5
₦ 31,000-₦60,000	83	19.8
₦ 61,000-₦90,000	137	32.6
₦ 91,000 and above	118	28.1
Total	420	100

Table 2 shows the consumption pattern of ultra-processed food and drink products by the respondents. More than half of the respondents (53.8%) consumed instant noodles from time to time, about a quarter of them (41.2%) consumed instant noodles daily, and a small amount (5.2%) never consumed instant noodles. Soft drinks were consumed by most (75.5%) of the respondents from time to time, while 20.7% consumed it daily. Packaged bread was consumed by 50% of the respondents from time to time, about 46.7% consumed it daily. Most of the respondents (81.9%) consumed cakes from time to time, while 14.8% ate it daily. Doughnuts (11%), breakfast

cereals (30.5%), chocolate bars (10.2%), candy/sweets (11.7%), margarine/ spreads (21.0%) and cookies (13.6%) were consumed daily by the respondents. Ultra-processed foods like; canned fish (81.7%), canned meat (80.5%), Doughnut (82.2%), chocolate bars (81.1%), hot dogs (80.2%), ice cream (80%), pizza (85.1%), sharwama (82.9%), sausages (81.8%) and chips (83.1%) were consumed by the respondents from time to time. Furthermore, beer (31.2%), hamburger (30.5%), flavoured yoghurt (22.1%), salted/sugar nuts (20%), were the most foods never consumed by the respondents.

Table 2. Consumption of ultra-processed food and drink products by the respondents

Variables	Daily		Sometimes		Never		Total	
	No	%	No	%	No	%	No	%
Instant noodles	173	41.2	225	53.8	22	5.2	420	100
Soft drinks	87	20.7	317	75.5	16	3.8	420	100
Packaged bread	196	46.7	210	50.0	14	3.3	420	100
Cakes	62	14.8	344	81.9	14	3.3	420	100
Canned fish	25	6.0	343	81.7	52	12.3	420	100
Canned meat	22	5.2	338	80.5	60	14.3	420	100
Canned vegetables	25	6.0	322	76.6	73	17.4	420	100
Canned fruits	22	5.2	335	79.7	63	15.0	420	100
Doughnut	46	11.0	345	82.2	29	6.9	420	100
Breakfast cereals	128	30.5	262	62.5	30	7.1	420	100
Chocolate bars	43	10.2	341	81.1	36	8.6	420	100
Candy/sweets	49	11.7	335	79.8	36	8.6	420	100
Hotdogs	18	4.3	337	80.2	65	15.5	420	100
Ice cream	39	9.3	336	80.0	45	10.7	420	100
Margarine/spreads	88	21.0	277	60.6	55	13.1	420	100
Pasta	36	8.6	321	76.4	63	15.0	420	100
Instant sauces	41	9.8	310	73.8	69	16.4	420	100
Sausages	30	7.1	344	81.8	46	11.0	420	100
Cereal bars	48	11.4	316	75.2	56	13.3	420	100
Cookies	57	13.6	306	72.9	57	13.6	420	100
Sodas	46	11.0	329	78.3	45	10.7	420	100
Chips	36	8.6	349	83.1	35	8.3	420	100
Pizza	14	3.3	357	85.1	49	11.7	420	100
Sharwama	15	3.6	348	82.9	57	13.6	420	100
Canned beer	16	3.8	273	65.0	131	31.2	420	100
Hamburger	19	4.5	273	65.0	128	30.5	420	100
Salted/sugar nuts	40	9.5	296	70.4	84	20.0	420	100
Pickled vegetable	33	7.9	309	73.6	78	18.6	420	100
Flavoured yoghurt	36	8.6	291	69.3	93	22.1	420	100
Fish/chicken nuggets	56	13.3	297	70.7	67	16.0	420	100
Instant soups	76	18.1	287	68.4	57	13.6	420	100

Figure 1 shows the anthropometric status of the respondents. About half of the adolescents (57.4%) studied had a normal body weight, 35.5% were underweight, while 5.2% and 1.9% were overweight and obese respectively.

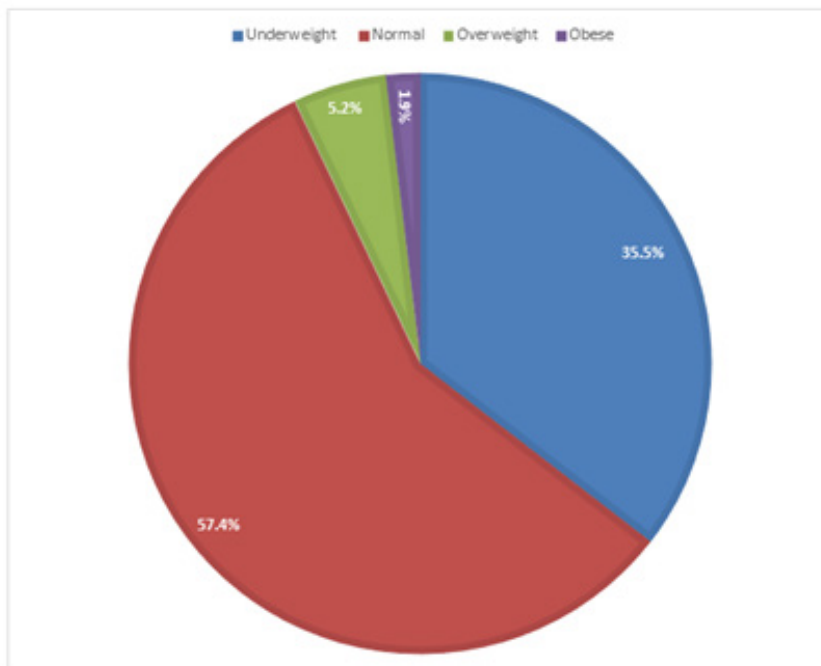


Figure 1. Anthropometric status of adolescents.

Figure 2 shows the anthropometric status of adolescents studied by sex. Females were more underweight (39.8%) than their male (31.1%) counterparts. Male respondents were more overweight (6.7%) than females (3.8%). Also the male adolescents were more obese (2.4%) than the females (1.4%).

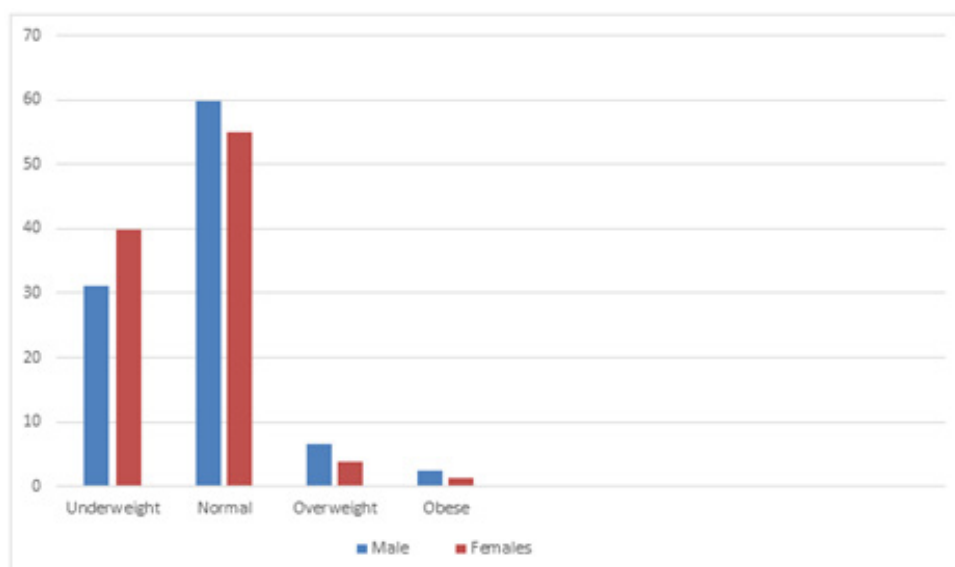


Figure 2. Anthropometric status of adolescents by sex.

Table 3 shows the relationship between some selected ultra-processed foods and drinks and anthropometric status of the respondents. About 14% of the respondent who consumed instant noodles daily was underweight; 2.1% were overweight and 1.9% obese. For the consumption of soft drinks, 8.3% and 1.2% of adolescents who consumed it daily were underweight and overweight respectively. About 6.1%, 0.7% and 0.2% of respondents who consumed cake daily were underweight, overweight and obese respectively. About 15% of adolescents who consumed packaged bread daily were underweight, 4.0% were overweight, while 1.2% were obese. For canned fish consumption, 1.2%, 0.2% and 0.2% of respondents who consumed it daily were underweight, overweight and obese respectively. About 5.7% of adolescents who consumed candy/sweets daily were underweight, while 0.7% and 0.5% were overweight and obese respectively. The chi-square analysis showed no significant relationship between consumption of instant noodles, soft drinks, cakes, packaged bread, canned fish, candy/sweets and anthropometric status

of the respondents. Furthermore, About 1.4% and 0.9% of respondents who consumed margarine/spreads daily were overweight and obese respectively. For the consumption of pasta, 0.7% and 0.2% of adolescents who consumed it daily were overweight and obese respectively. About 1.7% and 0.5% of respondents who consumed sausages daily were underweight and overweight respectively. About 3.8% of adolescents who consumed chips daily were underweight, 0.7% were overweight, while 0.2% were obese. For canned meat consumption, 0.5%, 0.7% and 0.2% of respondents who consumed it daily were underweight, overweight and obese respectively. About 3.3% of adolescents who consumed ice-cream daily were underweight, while 0.9% were overweight. About 0.7% of the respondents who consumed sharwama daily were overweight. The chi-square analysis showed there was a significant relationship between consumption of canned vegetables, margarines/spreads, sausages, chips, canned meat and anthropometric status of the respondents.

Table 3. Relationship between ultra-processed foods consumption and anthropometric status of respondents

Variables	Underweight		Normal		Overweight		Obese		Total	
	No	%	No	%	No	%	No	%	No	%
Instant noodles										
Daily	59	14	101	24	9	2.1	4	0.9	173	41.1
Sometimes	85	20.2	124	29.5	12	2.9	4	0.9	225	53.5
Never	5	1.2	16	3.8	1	0.2	0	0	22	5.2
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Soft drinks										
Daily	35	8.3	47	11.1	5	1.2	0	0	87	20.7
Sometimes	109	25.9	183	43.5	17	4	8	1.9	317	75.4
Never	5	1.2	11	2.6	0	0	0	0	16	3.8
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Cakes										
Daily	26	6.1	32	7.6	3	0.7	1	0.2	62	14.7
Sometimes	116	27.6	202	48	19	4.5	7	1.7	344	81.9
Never	7	1.7	7	1.7	0	0	0	0	14	3.3
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Packaged bread										
Daily	63	15	111	26.4	17	4	5	1.2	196	46.6
Sometimes	81	19.2	121	28.8	5	1.2	3	0.7	210	50
Never	5	1.2	9	2.1	0	0	0	0	14	3.3
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100

Canned fish										
Daily	5	1.2	18	4.3	1	0.2	1	0.2	25	6
Sometimes	124	29.5	193	46	20	4.8	6	1.4	343	81.7
Never	20	4.8	29	6.9	1	0.2	1	0.2	52	12.4
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Candy/ sweets										
Daily	24	5.7	20	4.8	3	0.7	2	0.5	49	11.6
Sometimes	113	27	199	47.3	17	4	6	1.4	335	79.7
Never	12	2.9	22	5.2	2	0.5	0	0	36	8.6
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100

Instant noodles: body mass index=0.071; Soft drink: body mass index: p=0.349; Packaged bread: body mass index: p=0.062; Cakes: body mass index: p=0.071; Canned Fish: body mass index: p=0.070; candy/sweets: body mass index: p=0.000.

Table 3 cont. Relationship between ultra-processed foods consumption and anthropometric status of respondents

Variables	Underweight		Normal		Overweight		Obese		Total	
	No	%	No	%	No	%	No	%	No	%
Canned vegetables										
Daily	2	0.5	20	4.8	3	0.7	0	0	25	6
Sometimes	120	28.6	182	43.3	14	3.3	6	1.4	322	76.6
Never	27	6.4	39	9.2	5	1.2	2	0.5	73	17.3
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Margarine/spreads										
Daily	32	7.6	46	11	6	1.4	4	0.9	88	21
Sometimes	97	23	164	39	15	3.8	1	0.2	277	66
Never	20	4.8	31	7.3	1	0.2	3	0.7	55	13
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Pasta										
Daily	12	2.9	20	4.8	3	0.7	1	0.2	36	8.6
Sometimes	112	26.6	187	44.5	17	4	5	1.2	321	76.4
Never	25	6	34	8	2	0.5	2	0.5	63	15
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Sausages										
Daily	7	1.7	21	5	2	0.5	0	0	30	7.1
Sometimes	12	2.9	189	45	20	4.8	6	1.4	344	81.9
Never	13	3	31	7.3	0	0	2	0.5	46	11
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Chips										
Daily	15	3.8	17	4	3	0.7	1	0.2	36	8.6
Sometimes	125	29.8	200	47.6	18	4.2	6	1.4	349	83
Never	9	2.1	24	5.7	1	0.2	1	0.2	35	8.3
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100

Canned meat										
Daily	2	0.5	16	3.8	3	0.7	1	0.2	22	5.2
Sometimes	128	30.4	189	45	16	3.8	5	1.2	338	80.4
Never	19	4.5	36	8.6	3	0.7	2	0.5	60	14.2
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Ice-cream										
Daily	14	3.3	21	5	4	0.9	0	0	128	30.4
Sometimes	117	27.9	195	46.4	17	4	7	1.7	262	62.3
Never	18	4.2	25	6	1	0.2	1	0.2	30	7.1
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100
Sharwama										
Daily	4	0.9	8	1.9	3	0.7	0	0	15	3.6
Sometimes	129	30.7	197	47	16	3.8	6	1.4	348	82.8
Never	16	3.8	36	8.6	3	0.7	2	0.5	57	13.6
Total	149	35.5	241	57.4	22	5.2	8	1.9	420	100

Canned vegetables: body mass index: p=0.000; margarine/spreads: p= 0.000; sausages: p=0.000; chips: =1, p=0.000; canned meat: body mass index: p=0.009.

DISCUSSIONS

In this study, all the respondents were adolescents, and there were more females than males. Majority of the respondents were secondary school students. Almost all the respondents were Christians. This is in support of Osuntokun [11], who reported that in Eastern Nigeria, more than 90% of the people are Christians. A lot of the respondents were from a moderate size household. This is in contrast with the findings of Oguizu and Celestine [12]. Majority of the respondents were from the Igbo ethnic group, this is so because the location of the study belongs to the Igbo ethnic group. Most of the respondents' parents had attained both secondary and tertiary education and were average income earners. This is in contrast with the findings of Oguizu and Celestine [12]. Few of the ultra-processed foods were consumed daily by the adolescents. There was a high daily consumption of instant noodles among the respondents and this may be due to affordability, availability and convenience of preparing instant noodles. This correlates with a study by Katmawati and Ulfah et al. [13] who reported a high consumption of instant noodles. Most of the ultra-processed foods were consumed from time to time by the respondents. This is similar to the study by Nikbakht et al. [14] who reported that the difference in consumption frequency of some ultra-processed foods over others could be attributed to the affordability, and availability of these products. The increase in ultra-processed food consumption among the respondents studied correlates with Monterio et

al. [15] report that consumption of ultra-processed foods and sweetened beverages is increasing rapidly. The consumption of ultra-processed foods in this study did not have much effect on the body mass index of the respondents as more than half of them maintained a normal body weight. This signifies that their consumption of ultra-processed foods was on the average. This correlates with the research of Moubarac et al. [10], who reported that in several countries, the level of consumption of ultra-processed foods highly correlated with overall diet quality. The prevalence of overweight in this study calls for concern as some of the respondents were on the borderline and if precaution is not taken, may be faced with the risk of overweight and obesity in later years. This result is in line with the report of Moubarac et al. [16] who reported that consumption of ultra-processed foods may increase the risk of overweight and obesity. The difference in body mass index between the female and male respondents in this study correlates with the study by Beunen et al. [17] who reported that the differences between boys and girls body composition are the result of gender differences in the amount and mass of skeleton and in the increase of muscle mass during growth and maturation. Hence we can say that the difference in body mass index between the female and male respondents studied could be attributed to other factors other than the consumption of ultra-processed foods and drinks. There was a significant relationship (p<0.05) between some of the ultra-processed foods and drinks consumed and anthropometric

status of the respondents studied. Thus there may be another variable like genes, physical inactivity and other factors interrupting the relationship of these variables. This result correlates with the findings of Oguizu and Celestine [12,18].

CONCLUSION

This study showed most parents were average income earners. There was a moderate consumption of ultra-processed foods among the adolescents studied. Some of respondents were on the borderline of overweight and obesity and this places a burden to increase the advocacy on nutrition education, there is need to increase the awareness on the importance of consumption of wholesome and natural foods among adolescents.

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Citation: Oguizu AD, et al. (2024). Consumption of Ultra-Processed Foods and Anthropometric Status of Adolescents in Umuahia North Local Government Area Abia State, Nigeria. *Nutraceutical Res*. 3(1):8.