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Consumption of Ultra-Processed Foods and Anthropometric Status of Adults in Ikwuano Local Government Area, Abia State Nigeria

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Abstract — *Background:* Ultra-processed foods are industrially formulated food products manufactured largely by food companies packaged in such a way to make them intensely palatable, have long shelf stability and eliminate the need for culinary preparations.
Objective: This study assessed the consumption of ultra-processed foods and anthropometric status of adults aged (20-49 years) in Ikwuano Local Government Area Abia State, Nigeria.
Methods: The study was a cross sectional survey of 440 adults randomly selected for the study. A well-structured and validated questionnaire was used to collect information on the socio-economic and demographic characteristics, the consumption of ultra-processed foods, the dietary pattern and anthropometric status of the respondents. The questionnaires were coded and entered into computer using the statistical package for social sciences (SPSS) version 23.0. The data were analyzed using descriptive statistics. Chi-square analysis was used to assess the relationship between the consumption of ultra-processed foods and anthropometric status of the respondents.
Results: More than half of the respondents (67.0%) were males while 33.0% were females. Majority of the adults (62.3%) were between the ages of 26 and 32 years. Majority of the respondents (80.0%) were Christian, about 18.0% were traditionalist, and more than half of the respondents (82.2%) were Igbo. More than half of the respondents (63.6%) had tertiary education. About a quarter of the respondents (48.0%) were traders/business persons, 27.7% were civil/public servant, 8.2% were farmers and 2.5% were unemployed. About a quarter of the respondents (46.8%) earned less than ₦30,000 a month. only a few of the respondents (3.4%) earned above ₦91,000 per month. One third of the respondents consumed sweets, candies, soft drinks, pizza, burger, pasta, canned vegetables and sweetened breakfast cereals daily. About half of the respondents (53.0%) who were overweight consumed soft drinks daily. A total of 36.3% of the respondents were overweight, while 20% were obese. The chi-square analysis showed there was a significant association ($p<0.000$) between consumption of cake, pizza, burger and BMI of the respondents. Obesity was higher amongst male adults than female adults.
Conclusion: One third of the respondents were overweight, while about 20% were obese. There is need to focus on educating the community on the need to consume home-made dishes from fresh indigenous foods.

Keywords *— Ultra-Processed Foods; Adults; Anthropometric Status; Abia State; Nigeria*

1. Introduction

The dietary patterns of the world population have been on transition due to the high consumption of ready-to-eat foods, which have increased levels of fat and sugar, and lower intake of unprocessed foods, such as fruits, vegetables, tubers, and cereals (Monteiro *et al*., 2011). The potential cause of the pandemic of overweight, obesity and rapid rise of related chronic diseases especially in under developed countries is the corresponding increase in the production, processing and consumption of readily available 'fast' or 'convenience' ready-to-eat or ready-to-heat processed food and beverage products (WHO, 2010). Ultra-processed foods are defined within the NOVA classification system, which groups foods according to the extent and purpose of industrial processing. NOVA is a food classification system developed by researchers at the university of Sao Paulo Brazil (Monteiro *et al.*, 2011). A practical way to identify an ultra-processed product is to check to see if its list of ingredients contains at least one item characteristic of the NOVA ultra-processed food group, which is to say, either food substances never or rarely used in kitchens (Monteiro *et al.*, 2015). Ultra-processed fast foods and soft drinks are the main business of transnational and big national catering chains, whose outlets are also often open until late at night, and whose products are designed to be consumed also in the street, while working or driving, or watching television (Allemandi, 2018).

The consumption of ultra-processed foods are increasing rapidly, replacing use of traditional or indigenous, culturally acceptable freshly cooked food (Moodie *et al.*, 2013). These Ultra-processed products are characteristically formulated from 'refined' and 'purified' ingredients freed from the fibrous watery matrix of their

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original raw materials. They are formulated to be sensually appealing, hyper-palatable, and habit-forming, by the use of sophisticated mixtures of cosmetic and other additives, and state of the craft packaging and marketing (Baker and Friel, 2016). The World Health Organization stated that sugary drinks, energy dense snacks and 'fast food', all of which are ultra-processed, are key drivers of obesity, diabetes, cardiovascular diseases and certain cancers (WHO, 2018). Most people crave and consume more of these ready to eat or convenient foods not necessarily because they want them but because they see these ultra-processed foods are the fastest and easiest food to prepare or consume. Others also consume them just to save time while others take them as meal to meet up their daily dietary requirement. There is a major concern on the increase in the prevalence of non-communicable diseases like hypertension, diabetes and stroke amongst adults, hence this study assessed the consumption of ultra-processed foods, dietary pattern and anthropometric status of adults aged (20-49 years) in Ikwuano Local Government Area, Abia State.

2. Materials and Methods

A preliminary visit was made to the local government chairman to obtain permission and approval for the research. The study was made possible by the approval of the members of the ethical committee of Ikwuano Local Government Area, Abia State. The respondents were also enlightened on the purpose of the study and their consent was obtained before the study was carried out. There was no monetary reward for participating in the study.

Study Area: The study was carried out in Ikwuano Local Government Area, Abia State, Nigeria. Ikwuano is one of the local government areas in Abia State. The headquarters is in Isiala Oboro. Ikwuano local government has an area of 281 km^2 and a population of 137,993 at the 2006 census. It is made up of about 37 communities and 314 villages and is bounded by Ini local government area of Akwa-Ibom State by the West and Umuahia South to the North. The occupations of the people are trading and small scale farming. Ikwuano LGA is known for her agricultural activities with much concentration of palm oil/kernel, cocoa, cocoyam, maize, melon, cassava, yam and a variety of vegetables. It is also known as the Food Basket of Abia State because of its richness in agricultural produce.

Population of the Study: The population of the study consists of both female and male adults (20-49 years) in Ikwuano Local Government Area, Abia State.

3. Sample Size and Calculations

The sample was determined using the Yamane's formula (Yamane, 1973) for sample size estimation.

Sample size (n) = $\frac{N}{1+N\,(e)2}$

n = sample size
N = Total population in Ikwuano LGA (137,993)
1 = constant
e = Precision or sampling error $(0.05)^2$
Substituting the values in the formula gives:

$$n = \frac{137993}{1+137993\ (0.05)^2}$$

$$n = \frac{137993}{137994\ (0.0025)}$$

$n = \frac{137993}{344.985}$ $n = 399.9 \approx 400$

Calculating drop out of 10%;

$$\frac{10}{100} \times 400 = 40$$

Sample size = 400 + 40 = 440

Sample size was rounded up to 440 to make up for drop outs.

3.1 Sampling Procedure

A multi-stage sampling technique was used for this study. Ikwuano comprises of 37 communities and four wards. Two wards (Oboro and Ibere) were selected using simple random sampling for the study. Five villages were randomly selected from the two wards out of the four wards in Ikwuano local government. The villages selected were; Umuariaga, Umudike, Amaoba-Ime, Amawom and Umugbalu. The households and adults were randomly selected. Each respondent from the household selected were interviewed and a questionnaire was given to them to fill. A total of 440 adults were selected for this study.

4. Data Collection

A well-structured and validated questionnaire was used to collect information on the socio-economic and demographic characteristics, the consumption of ultra-processed foods and the dietary pattern of the respondents.

4.1 Weight Measurement

The weight of the respondents were taken and recorded to the nearest 0.1 kilogram using a portable bathroom scale (Hansen Ireland Model). The scale was placed on a level ground and was regularly adjusted to zero for accuracy before the respondents stepped on it. The respondents were asked to remove any heavy items from their pockets and also any items of heavy clothing or apparel.

4.2 Height Measurement

The heights of the respondents were measured using a constructed height meter which was placed on a level floor close to the wall. The respondents were asked to remove

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their shoes before taking the measurement for accurate reading. They were asked to stand with their back resting on the wall and looking forward to ensure that the back of their feet, claves, bottom, upper back and back of their head are in contact with the wall. The respondents stood directly underneath the measuring device, the device was lowered until it rests gently on top of the respondent's head and then the measurements were recorded to the nearest 0.1 centimeters.

4.3 Dietary Assessment

A structured food frequency questionnaire on dietary feeding was used to determine the dietary pattern of the adults. The food frequency questionnaire was used to determine how often the respondents consume ultra-processed food. The food frequency questionnaire consisted of list of ultra-processed food products and drinks with response categories to indicate frequency of consumption over a period of time.

5. Data Analysis

The anthropometric data (weight and height) were used to obtain the body mass index of the respondents. The BMI was categorized using reference standard. Statistical analysis was performed using the statistical package for service solutions version 23.0. Descriptive statistics was used to determine the socio-economic and demographic characteristics, consumption of processed and ultra-processed foods and dietary pattern of the respondents. Chi-square analysis was used to assess the relationship between the consumption of ultra-processed foods, dietary pattern and the anthropometric status of the respondents. P value of < 0.05 was considered statistically significant.

6. Results

Table 1 shows the socio-economic and demographic characteristics of the respondents. Majority of the respondents (67.0%) were male while about 33.0% were female. More than half of the respondents (62.3%) were between the ages of 26 and 32 years. About 19.5% of the respondents were between the ages of 19 and 25 years. Majority of the respondents (80.0%) were Christian, about 18.0% were traditionalist, while a few of the respondents (1.6%) were Muslims. More than half of the respondents (82.2%) were Igbo, 9.1% were Hausa and 7.3% were Yoruba. More than half of the respondents (63.6%) had tertiary education, about 19.3% had secondary school education and 11.1% had little or no education. About a quarter of the respondents (48.0%) were traders/business persons, 27.7% were civil/public servant, 8.2% were farmers and 2.5% were unemployed. About a quarter of the respondents (46.8%) earned less than ₦30,000 a month. One third of the respondents (30.5%) earned between ₦31,000-₦60000 a month, only a few of the respondents (3.4%) earned above ₦91,000 per month.

Table 1. Socio-economic and demographic characteristics of the respondents

Variable	Frequency	Percentage
Age range (years)		
19-25	86	19.5
26-32	274	62.3
33-39	72	16.4
40-49	8	1.8
Total	**440**	**100**
Gender		
Male	295	67
Female	145	33
Total	**440**	**100**
Religion		
Christianity	352	80
Traditional	81	18
Islam	7	1.6
Total	**440**	**100**
Ethnic group		
Igbo	361	82.2
Hausa	40	9.1
Yoruba	32	7.3
Others	7	1.6
Total	**440**	**100**
Educational qualification		
Non formal	49	11.1
Secondary	85	19.3
Tertiary	280	63.6
Vocational education	26	5.9
Total	**440**	**100**
Income level		
Less than ₦30,000	206	46.8
₦31,000-60,000	134	30.5
₦61,000-90,000	85	19.3
₦91,000 and above	15	3.4
Total	**440**	**100**
Occupation		
Civil/public servant	122	27.7
Farmer	36	8.2
Trader/business person	211	48.0
Student	23	5.2
Artisan/craft person	37	8.4
Unemployed	11	2.5
Total	**440**	**100**

Table 2 shows the consumption pattern of ultra-processed foods and drinks by the respondents. A quarter of the respondents (40.9%) consumed sweets daily, while 27.7% of them consumed sweets weekly. One third of the respondents (34.1%) consumed candies daily, while about 28.9% consumed candies weekly. A quarter of the respondents (41.6%) consumed soft drinks daily, while about 28.0% consumed soft drinks weekly. About 20.0% of

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the respondent consumed cheese daily, 18.3% consumed cheese weekly while 50.9% rarely consumed cheese. About 10.5% consumed sardine daily, while about 33.1% of the respondents consumed sardine weekly. About 5.0% consumed canned meat daily, while 28.6% consumed canned meat weekly. About 26.4% consumed mayonnaise weekly, while 33.9% of the respondents rarely consumed mayonnaise. More than a third (30.9%) of the respondents consumed pizza daily while about 9.1 % consumed pizza weekly. About a third (30.1%) of the respondents consumed burger daily, while 14.3% consumed burger weekly. About 26.1% of the respondents consumed cake daily, while 26.0% consumed cake weekly. About 19.5% of the respondents consumed sausages daily, while 22.1% consumed sausages weekly. About 47.1% of the respondents consumed hot dogs weekly. About 7.3% of the respondents consumed ice cream daily, while 35.2% consumed ice cream weekly. About 22.3% of the respondents consumed beer daily, while 24.1% consumed beer weekly. About 8.2% of the respondents consumed sharwama daily, while 30.6% consumed sharwama weekly. One third (31.1%) of the respondents consumed pasta daily, while 38.0% consumed pasta weekly. About a quarter (37.4%) and few (8.9%) of the respondents consumed canned fruits and vegetables daily, while less than half (40.0%) of the respondents consumed canned fruits and vegetables weekly. About 26.0% of the respondents consumed instant noodles daily. About a quarter of the adults (46.4%) consumed sweetened breakfast cereals daily.

Table 2. Consumption pattern of ultra-processed foods and drinks of the respondents studied

Variables	Daily		Once a week		2-3 times per week		Rarely		Total	
	F	%	F	%	F	%	F	%	F	%
Sweets	180	40.9	122	27.7	103	14.0	35	17.4	**440**	**100**
Candies	155	34.1	144	28.9	73	20.8	68	16.2	**440**	**100**
Soft drinks	183	41.6	53	16.2	103	28.0	101	14.2	**440**	**100**
Cheese	88	20.0	76	18.3	26	10.8	250	50.9	**440**	**100**
Sardine	46	10.5	132	30.0	46	33.1	216	26.4	**440**	**100**
Canned meat	10	5.0	91	20.7	38	28.6	83	45.7	**440**	**100**
Mayonnaise	36	1.4	99	7.5	21	26.4	284	33.9	**440**	**100**
Prawn cracker	10	5.0	21	4.8	37	48.4	372	41.8	**440**	**100**
Pizza	48	30.9	23	8.2	141	9.1	228	51.8	**440**	**100**
Burger	147	30.1	47	14.3	46	10.1	200	45.5	**440**	**100**
Cakes	115	26.1	64	6.4	79	26.0	182	41.4	**440**	**100**
Cookies	108	24.5	86	11.1	87	28.3	159	36.1	**440**	**100**
Energy drink	84	20.0	73	9.7	76	23.3	207	47.0	**440**	**100**
Sausages	50	19.5	121	4.8	33	22.1	236	53.6	**440**	**100**
Hot dogs	15	3.4	51	5.0	178	47.1	196	44.5	**440**	**100**
Sandwich	32	7.3	102	23.2	67	15.2	239	54.3	**440**	**100**
Ice cream	19	7.3	50	8.2	154	35.2	217	49.3	**440**	**100**
Jam	33	23.5	30	22.7	129	20.6	248	33.2	**440**	**100**
Beer	199	22.3	93	24.1	33	7.5	115	46.1	**440**	**100**
Chocolates	33	10.0	158	35.2	206	24.1	43	30.7	**440**	**100**
Sharwama	36	8.2	44	30.6	200	24.8	160	36.2	**440**	**100**
Cheese ball	17	3.9	34	10.6	195	49.3	194	26.6	**440**	**100**
Canned fish	17	3.1	144	20.0	190	47.0	89	30.2	**440**	**100**
Pasta	49	31.1	37	8.4	267	38.0	87	22.6	**440**	**100**
Flavored yoghurt	93	21.1	76	17.3	173	32.3	98	29.3	**440**	**100**
Canned fruits	39	8.9	53	40.0	99	17.5	249	33.6	**440**	**100**
Canned vegetables	131	37.4	158	26.2	110	27.0	41	9.3	**440**	**100**
Sweetened juices	50	8.2	101	18.6	96	21.8	193	51.3	**440**	**100**
Instant noodles	98	26.0	80	15.5	72	18.1	190	40.3	**440**	**100**
Bread and buns	99	25.5	66	14.2	67	13.0	208	47.3	**440**	**100**
Sweetened breakfast cereals	200	46.4	114	26.0	74	16.8	52	10.7	**440**	**100**

Table 3 shows the anthropometric status of the respondents. About 20.5% of the males had normal body mass index, while 21.8% of the females had normal body mass index. A total of 36.3% of the respondents were overweight, while 20% were obese. About 13.6% of the male respondents were overweight, while 22.7% of the female respondents were overweight. About 11.4% of the male respondents were obese, while 8.6% of the female respondents were obese.

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Table 3. Anthropometric status of the respondents by sex

BMI	Male		Female		Total	
	No	%	No	%	No	%
Underweight	4	0.9	2 0.5		6	1.4
Normal	90	20.5	96	21.8	186	42.2
Overweight	60	13.6	100	22.7	160	36.3
Obesity	50	11.4	38	8.6	88	20.0
Total	**204**	**46.4**	**236**	**53.6**	**440**	**100**

Table 4 shows the relationship between consumption of ultra-processed foods and body mass index of the respondents. About 17.5% and 8.6% of the respondents who were overweight and obese respectively consumed sweets daily. The chi-square analysis showed there was no significant association (p=0.775) between the consumption of sweet and BMI of the respondents. About 22% and 3.6% of the respondents who were overweight and obese respectively consumed soft drinks. The chi-square analysis showed there was no significant association between consumption of soft drinks and BMI of the respondents (p=0.639). About 9% and 8.46% of the respondents who were overweight and obese respectively consumed cake daily. The chi-square analysis showed that there was a significant association between consumption of cake and BMI of the respondents (p=0.000). About 5.9% and 6.3% of the respondents who were overweight and obese respectively consumed cookies daily. The chi-square analysis showed there was no significant association between consumption of cookies and BMI of the respondents (p=0.254). About 14.7% and 3.6% of the respondents who were overweight and obese respectively consumed beer daily. The chi-square analysis showed there was no significant association between consumption of beer and BMI of the respondents (p=0.258). About 7.9% and 2.5% of the respondents who were overweight and obese respectively consumed instant noodles daily. The chi-square analysis showed there was no significant association between consumption of instant noodles and BMI of the respondents (p=0.239). About 9% and 8.46% of the respondents who were overweight and obese respectively consumed cake daily. About 6.3% and 3.1% of the respondents who were overweight and obese respectively consumed sweetened breakfast cereals daily. There was no significant association between consumption of sweetened breakfast cereals and BMI of the respondents (p=1.906). About 6.1% and 7% of the respondents who were overweight and obese respectively consumed pizza daily. There was a significant association between consumption of pizza and BMI of the respondents (p=0.000). About 5% and 3.1% of the respondents who were overweight and obese respectively consumed burger daily. There was a significant association between consumption of burger and BMI of the respondents (p=0.003).

Table 4. Relationship between consumption of ultra-processed foods and body mass index

Variables	Underweight		Normal		Overweight		Obese		Total		P-value
	No	%	No	%	No	%	No	%	No	%	
SWEET[a]											
Daily	0	0.0	65	14.7	77	17.5	38	8.6	180	40.9	**0.775**
Once weekly	0	0.0	49	11.1	68	15.4	18	4.0	135	30.6	
2-3times weekly	0	0.0	61	13.8	15	3.4	17	3.8	93	21.1	
Rarely	6	1.4	11	2.5	0	0.0	15	3.4	32	7.2	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
SOFT DRINKS[b]											
Daily	0	0.0	70	15.9	97	22.0	16	3.6	183	41.5	**0.639**
Once weekly	0	0.0	25	5.6	11	2.5	30	6.8	66	15	
2-3times weekly	6	1.4	66	15	38	8.6	25	5.6	135	30.6	
Rarely	0	0.0	25	5.6	14	3.1	17	3.8	56	12.7	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
CAKE[c]											
Daily	6	0.0	42	9.5	40	9.0	37	8.4	125	28.4	**0.000**
Once weekly	0	0.0	27	6.1	7	1.5	14	3.1	48	10.9	
2-3times weekly	0	0.0	43	9.7	25	5.6	17	3.8	85	19.3	
Rarely	0	0.0	74	16.8	88	20	20	4.5	182	41.3	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
COOKIES[d]											
Daily	0	0.0	64	14.5	26	5.9	28	6.3	118	26.8	**0.254**
Once weekly	0	0.0	33	7.5	19	4.3	11	2.5	63	14.3	
2-3times weekly	0	0.0	43	9.7	24	5.4	33	7.5	100	22.7	
Rarely	6	1.4	46	10.4	91	20.6	16	3.6	159	36.1	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	

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BEER[e]											
Daily	0	0.0	47	10.6	65	14.7	16	3.6	128	29	**0.258**
Once weekly	0	0.0	63	14.3	36	8.1	18	4	117	26.5	
2-3times weekly	0	0.0	31	7	14	3.1	15	3.4	60	13.6	
Rarely	6	1.4	45	10.2	45	10.2	39	8.8	135	30.6	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
INSTANT NOODLES[f]											
Daily	0	0.0	56	12.7	35	7.9	11	2.5	102	23.1	**0.239**
Once weekly	6	1.4	30	6.8	17	3.8	27	6.1	80	18.1	
2-3times weekly	0	0.0	32	7.2	26	5.9	15	3.4	73	16.5	
Rarely	0	0.0	68	15.4	82	18.6	35	7.9	185	42	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
SWEETENED BREAKFAST CEREALS[g]											
Daily	0	0.0	55	12.5	28	6.3	14	3.1	97	22	**1.906**
Once weekly	0	0.0	26	5.9	22	5	16	3.6	64	14.5	
2-3times weekly	6	0.0	33	7.5	8	1.8	24	5.4	71	16.1	
Rarely	0	0.0	72	16.3	102	23.1	34	7.7	208	47.2	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
PIZZA[h]											
Daily	0	0.0	38	8.6	27	6.1	31	7.0	96	21.8	**0.000**
Once weekly	6	0.0	29	6.5	10	2.2	8	1.8	53	12	
2-3times weekly	0	0.0	25	5.6	28	6.3	10	2.2	63	14.3	
Rarely	0	0.0	94	21.3	95	21.5	39	8.8	228	51.8	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	
BURGER[i]											
Daily	6	0.0	40	9	22	5	14	3.1	82	18.6	**0.003**
Once weekly	0	0.0	45	10.2	17	3.8	21	4.7	83	18.8	
2-3times weekly	0	0.0	39	8.8	1	0.2	27	6.1	67	15.2	
Rarely	0	0.0	62	14	120	27.2	26	5.9	208	47.2	
Total	**6**	**1.4**	**186**	**42.2**	**160**	**36.3**	**88**	**20**	**440**	**100**	

7. Discussions

The socio-economic and demographic characteristics of the respondents studied, showed that majority of the respondents were male. The high population of male participants obtained in this study could be due to the fact that houses visited had more males than females. This is consistent with the report from National Bureau of Statistics (NBS, 2015), that men constitute 50.5 % and women 49.5 % of adult population in Nigeria. The respondents were mostly Igbos and Christians. This is in line with Ismene (2002) report, that South-East is mostly dominated by Igbos and Christians. More than half of the respondents studied were between the age 26 and 32 years. The study showed that majority of the respondents were traders/business persons, only few of them were civil/public servants. This could be as a result of the high level of unemployment in Nigeria which leaves many people with no choice but to engage in trading and other small scale businesses. The study showed that majority of the respondents were low income earners, about one third were middle income earners. Socio-economic and demographic characteristics is not a modifier for the consumption of ultra-processed foods although it may play an important role in diet quality variations (Baraldi *et al*. 2014). The study showed that most of the respondents consumed ultra-processed foods like sweetened breakfast cereals, pizza, burger, noodles, sweets and soft drinks daily. This could be because there were readily available and easy to prepare; this is in line with the report made by Monteiro (2013), that convenient food requires less time cooking and also, that eating out is much easier than preparing meals from the scratch. Cheese balls, sardine fish, prawn crackers, hot dogs, ice-creams and pastas were listed as the top weekly ultra-processed foods consumed by the respondents; this is in correlation with the findings of Norimah (2018). Most people crave and consume ultra-processed foods because they are convenient foods and they save time. One third of the respondents were overweight while about 20% were obese; this could be due to high consumption of ultra-processed foods and wrong food choices made by the respondents in the study area. The result of this study is similar to that reported by Louzada *et al*. (2015) that excessive consumption of ultra-processed food products predisposes an individual to obesity which results from an

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imbalance between food intake and energy output leading to excessive fat accumulation. The study showed that females were more overweight than males. Obesity was slightly more among the male respondents than females. This result is in agreement with that reported by Louzada *et al*. (2015). The chi-square analysis showed that there was a significant association (p<0.000) between consumption of cake, pizza, burger and BMI of the respondents. Body mass index is regarded as an outcome of energy balance with particular reference to weight (Moubarac *et al*., 2013).

8. Conclusion

Majority of the respondents were male and more than half of the respondents studied were between the age 26 and 32 years. A greater percentage of the respondents consumed ultra-processed foods and drinks. The BMI status of the respondents showed that one third of the respondents were overweight, while about 20% were obese. Females were more overweight than males. Obesity was slightly more among the male respondents than females. There was a significant association (p<0.000) between consumption of cake, pizza, burger and BMI of the respondents.

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