



## Assessment of Ultra-Processed Foods Consumption and Overall Dietary Pattern of Undergraduate Students in Ondo City, Ondo State

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### Abstract

*The consumption pattern of ultra-processed foods (UPFs) among several populations is reportedly alarming, and minimising it and its attendant health risks is very challenging. This study sought to investigate the observed trends in UPFs consumption and overall dietary pattern among undergraduate students in Ondo City. Descriptive survey research design was to collect data from 240 university students representing a 2% of the study's population. The data was collected using the Ultra-Processed Foods Consumption Pattern and Effects on Students' Health Questionnaire (UCPESHQ) and used to answer three research questions using mean, standard deviation, simple ranking, and percentage. One null hypothesis was tested at 0.05 level of significance using Pearson Product-Moment Correlation (PPMC). Major findings are that undergraduate students consume sweet or savoury packaged snacks often, while they usually consume 16 other UPFs. A huge proportion of them (70.3%) skip breakfast, and UPFs consumption and overall dietary pattern have a positive, significant but very low correlation ( $r = 0.143$ ,  $p = 0.029$ ). This study concluded that the consumption of UPFs by undergraduate students in Ondo City is usual (habitual); that their consumption pattern is imbalanced; and that the relationship between the two is significant and positive, though very low. Hence, it was recommended that public sensitization should be carried out to educate undergraduate students about the risks associated with the consumption of ultra-processed foods and that undergraduate students should take personal responsibility to watch their diet and care for their health.*

**KEYWORDS:** CONSUMPTION PATTERN, ONDO CITY, RELATIONSHIP, ULTRA-PROCESSED FOODS (UPFs), UNDERGRADUATE STUDENTS.

### Introduction

The global food system is a complex network encompassing a vast array of products, from raw, unprocessed commodities to highly manufactured consumables. Naturally occurring food commodities can be purchased from the market and consumed raw or cooked as meals. However, some of these food items undergo several stages of processing either to prepare them

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for use in other foods (as in the case of condiments) or to enhance their palatability, reduce cost, and extend shelf life (as in the case of convenience foods). The latter category, characterised by extensive industrial manipulation, is commonly referred to as ultra-processed foods (UPFs).

Ultra-processed foods (UPFs) are food and drink products subjected to various processing methods, resulting in minimal intact nutrients. These products, typically ready-to-eat or drink, are ubiquitous in modern diets. They are ready-to-eat or drink (Oguizu & Celestine, 2021). The aim of producing UPFs is to increase shelf life, accessibility, convenience, taste appeal, appearance, and consumption readiness. Nevertheless, they are typically low in fibre and micronutrients, while often being high in sodium. Examples include sweet cookies and cakes, industrialised popcorn and snacks, reconstituted meat, sweets and candies, soft drinks and industrialised fruit juices, salty crackers, fast food snacks, sweetened milk drinks, lasagna and savoury pies, instant noodles, loaves of bread, hamburgers, packaged roasted peanuts, chocolate powder, flavoured and sweetened corn starch mixtures, industrialised flour, margarine, industrialized sauces, soda, snacks, ice cream, chocolates, and sausages (Costa-Louzada et al., 2015; Monteiro et al., 2018). The ubiquity of UPFs is a matter of concern, particularly among vulnerable populations such as young adults, especially university students.

Processed and ultra-processed foods are favoured by various groups, including undergraduate students. In this study, undergraduate students refer to those pursuing regular Bachelor's degree programs. These individuals often reside on campus in halls of residence or off-campus near the university. They are likely to have limited culinary expertise and may be especially susceptible to the allure of these convenient food options. This study excludes part-time or distance learning students, the program structure, duration, and residential arrangements differ significantly.

The overall consumption pattern of UPFs among undergraduate students is alarming. Oguizu and Celestine (2021) reported daily cake consumption among 65.6% of adolescents in Aba North Local Government Area. Additionally, soft drinks, packaged breads, cookies, and instant noodles were consumed regularly by approximately 74.7%, 68.8%, 71.8%, and 59.9% of the population, respectively. Otemuyiwa & Adewusi (2012) found that many students ate twice daily, replacing the third meal with snacks. Milk and alternatives were consumed minimally (25% female, 10% male), and about 85%, 60%, and 40% did not meet the recommended dietary allowance (RDA) for protein, iron, and calcium. UPFs contribute nearly half of the daily energy intake for university students (Mescoloto et al., 2017). This dietary pattern, potentially influenced by factors such as family convenience, time constraints due to academic workload, low socioeconomic status, or inadequate nutrition education, can have adverse health effects if unchecked.

Reducing UPF consumption and associated health risks is challenging. Policy development and implementation, coupled with personal responsibility among undergraduate students, are crucial. For example, the Brazilian government's Dietary Guidelines (second edition) emphasised food quality and recommended reducing processed and ultra-processed food intake while promoting natural and minimally processed options (Mescoloto et al., 2017). Similar initiatives are needed in Nigeria. Food processing companies should minimise nutrient depletion, advertising should accurately represent UPFs, and food fortification and nutrient supplementation should be encouraged.

Ondo City, a growing metropolis in Ondo State of Nigeria, hosts several higher education institutions, including Adeyemi Federal University of Education. Its size, federal status, and large student population make it a suitable location for this study. The city's dynamic environment, including its student population, creates a favourable market for UPFs. This study aims to assess UPF consumption and overall dietary patterns among undergraduate students in Ondo City, Ondo State.

Understanding the UPF consumption patterns of undergraduate students in Ondo City offers a microcosm of a global challenge. The findings of this study can contribute to the broader discourse on the impact of ultra-processed foods on public health, particularly among young people, not only in Nigeria, but worldwide.

### **Statement of the Problem**

Several activities compete for students' attention, including academic studies and nonacademic social activities. Many undergraduate students in several institutions of higher learning within the city are caught in the web of these activities so that they have very limited time to cook balanced meals at least once a day. They are often left with the option of eating out at restaurants and other eateries or feeding on convenience foods. The former option usually exposes students to food items that are largely overly saturated with seasonings and preservatives which are not safe for their health. The latter leaves them at the mercy of ultra-processed foods, which are usually although cheap and fast but less nutritious. The researcher had a first-hand experience of the rigor of academics, resulting neglect of nutritional needs, and the adverse effects on health in this city. It is rather painful to think of hundreds of students who are victims or even dependent on this negative nutritional trend, usually due to ignorance of the cumulative effects of such a practice. Hence, this study sought to investigate the observed trend in UPFs consumption and the overall dietary pattern of undergraduate students.

### **Research Objectives**

The main objective of this study was to assess the consumption of ultra-processed foods (UPFs) and the overall dietary pattern among undergraduate students in the Ondo City of Ondo State. The specific objectives were to:

1. document the frequency of UPFs consumption among undergraduate students in Ondo City,
2. document the overall dietary pattern of undergraduate students in Ondo City,
3. determine if there is a correlation between the consumption of UPFs and the overall dietary pattern of undergraduate students in Ondo City, and
4. highlight the strategies to minimize the consumption of ultra-processed foods among undergraduate students in Ondo City.

### **Research Questions**

The following research questions guided the study.

1. How frequently are ultra-processed foods consumed among undergraduate students in Ondo City?
2. What is the overall dietary pattern of undergraduate students in Ondo City?
3. What are the strategies to minimize the consumption of ultra-processed foods among undergraduate students in Ondo City?

**Research Hypothesis**

The following null hypothesis was tested at 0.05 level of significance.

H0: There is no significant correlation between the consumption of UPFs and the overall dietary pattern of undergraduate students in Ondo City.

**Design of the Study**

A descriptive survey research design was employed to investigate the consumption patterns of ultra-processed foods (UPFs) among undergraduate students. This methodological approach is well-suited for collecting quantitative data on a specific population, allowing for statistical analysis to answer the research questions. The study focused on gathering information about the frequency of UPF consumption, overall dietary patterns, and students' perceptions regarding strategies to mitigate their intake.

**Area of the Study**

The research was conducted in Ondo City, Ondo State, Nigeria. The city hosts three institutions offering undergraduate degrees: Adeyemi Federal University of Education, the University of Medical Sciences, and Wesley University. Given its size, population, and representativeness, Adeyemi Federal University of Education was selected as the primary study site to ensure a sufficient and diverse sample.

**Population and Sample**

The study population comprised all undergraduate students enrolled in regular degree programs at the Adeyemi Federal University of Education, estimated at 12,000 students based on the records of the university's Management Information System (MIS, 2021).

A sample size of 240 students was determined, representing 2% of the population. A multi-stage sampling technique was implemented. Initially, four faculties with the largest student populations were randomly selected. Subsequently, equal numbers of male and female students were purposively chosen from each selected faculty. Finally, stratified random sampling was employed to distribute the sample across faculties based on the availability of research assistants.

**Instrument for Data Collection**

A structured questionnaire titled "Ultra-Processed Foods Consumption Pattern and Effects on Students' Health Questionnaire" (UCPESHQ) was developed as the primary data collection instrument. The questionnaire was informed by established frameworks such as the Diet and Behaviour Score (DABS) by Richards and Smith (2015) and the NOVA Food Classification System put forward by the Centre for Epidemiological Studies in Health and Nutrition (2016). It has seven sections, "A" through "G". Section A asked for the demographic information of the respondents, such as faculty, gender, and level. Section B measured the frequency of consumption of the 20 most common UPFs among undergraduate students on a 5-point rating scale. Section C contained six "Yes" or "No" items that measured the overall dietary pattern of the respondents. Section D asks 15 "Yes" or "No" items about their self-reported ailments (SRA) and medically diagnosed ailments (MDA). Section E contained four items to record the clinical features of undergraduate students (skin, eyes, hair, and mouth). Section F contained two items to measure the anthropometry of the respondents by range (weight and height). The

last section contained seven 4-point Likert-scale question items on the strategies for minimising the consumption of UPFs.

Content and face validity of the questionnaire were established through expert review by one nutritionist, two food scientists, and two home economics educators. Reliability analysis using the split-half method yielded a correlation coefficient of 0.708, indicating a high degree of internal consistency ( $\alpha = 0.01$ ).

### **Data Collection Procedures**

A total of 240 questionnaires were administered to undergraduate students with the assistance of six trained research assistants. Data collection involved questionnaire completion, anthropometric measurements, and clinical observations. To ensure data quality, a rigorous training session was conducted for research assistants, covering research objectives, questionnaire administration, and measurement techniques. A WhatsApp group was utilised for efficient communication and coordination among the research team.

### **Data Analysis**

The collected data was subjected to statistical analysis to address the research objectives. Descriptive statistics, including mean, standard deviation, and frequency distributions, were employed to characterise the sample and describe UPF consumption patterns. An inferential statistic, namely particularly Pearson Product-Moment Correlation (PPMC), was used to examine relationships between variables at the 0.05 significance level. The decision rules were based on Tables 1 to 3.

### **Ethical Considerations**

This study was excepted from obtaining ethical approval under the Nigerian Code for Health Research Ethics (NCHRE) published by the Federal Ministry of Health (2007). This is because it uses survey procedures to measure a public behaviour. The researchers sought the consent of participants before administering the survey instrument to them. The information obtained were recorded anonymously and confidentially.

Table 1 Statistical Real Limits of Responses to Research Question One

Response Category	Point	Limit	Decision
Everyday	5	4.50-5.00	Always
Once in three days	4	3.50-4.49	Often
Once per week	3	2.50-3.49	Usually
Once per month	2	1.50-2.49	Sometimes
Never	1	0.50-1.49	Never

Note. Source: Researchers (2023)

Table 2 Statistical Real Limits of Responses to Research Question Three

Response Category	Point	Limit	Decision
Strongly agree (SA)	4	3.50-4.00	Agreed
Agree (A)	3	2.50*-3.49	Agreed
Disagree (D)	2	1.50-2.49	Disagreed
Strongly Disagree (SD)	1	0.50-1.49	Disagreed

Note. \* = 2.50, the cut-off point accepted as “agreed”. Source: Researchers (2023)

Table 3 Statistical Real Limits of Correlation Values (Hypothesis)

Ranges of Correlation Coefficient	Decision
± 0.80-1.00	Very High
± 0.60-0.79	High
± 0.40-0.59	Moderate
± 0.20-0.39	Low
± 0.00-0.19	Very Low

Note. ± depicts the direction of the correlation, which is either positive or negative. Source: Researchers (2023)

## Findings and Discussion

### Research Question 1: How frequently are ultra-processed foods consumed among undergraduate students in Ondo City?

This study investigated how frequently undergraduate students consume 20 UPFs. Table 4 reveals that they consume sweet or savoury packaged snacks often, while they usually consume 16 UPFs, and sometimes consume three (namely, pies, pasta, and pizza dishes; infant formulas & drinks, and meal replacement shakes; and distilled alcoholic beverages). On average, they usually consume UPFs ( $\bar{x} = 2.90$ ). The SD ranged from 1.105 to 1.527 and was 1.243 on average, indicating that the responses are moderately dispersed from the mean.

Table 4 Mean and Standard Deviation of the Frequency of UPFs Consumption among Undergraduate Students in Ondo City

SN	UPF	$\bar{x}$	SD	Decision	Rank
1	Sweet or savoury packaged snacks	3.52	1.113	Often	1
2	Confectionery (chocolate and candies)	2.88	1.114	Usually	12
3	Mass-produced packaged breads and buns	3.48	1.105	Usually	2
4	Margarine and other spreads	2.72	1.140	Usually	14
5	Cookies (biscuits), pastries, cakes, and cake mixes	3.43	1.255	Usually	3
6	Breakfast cereals (such as cornflakes), energy bars	2.90	1.325	Usually	11
7	Pies, pasta, and pizza dishes	2.49	1.263	Sometimes	18
8	Poultry/fish nuggets and sticks	3.08	1.470	Usually	8
9	Sausages, burgers, hotdogs and other reconstituted meat products	2.56	1.265	Usually	16
10	Powdered and packaged 'instant' soups	2.58	1.527	Usually	15
11	Instant noodles	3.25	1.213	Usually	6
12	Instant sauces	2.84	1.345	Usually	13
13	Energy and sports drinks	3.30	1.268	Usually	5
14	Milk drinks, fruit yoghurts, and fruit drink	3.37	1.154	Usually	4
15	Cocoa/chocolate drinks	2.91	1.187	Usually	10
16	Sweetened juices	2.93	1.147	Usually	9
17	Carbonated soft drinks, soda, cola	3.23	1.271	Usually	7
18	Distilled alcoholic beverages such as whisky, gin, and rum.	1.98	1.308	Sometimes	20
19	Ice cream and frozen desserts	2.50	1.105	Usually	17
20	Infant formulas & drinks and meal replacement shakes	1.99	1.288	Sometimes	19
Average		2.90	1.243	Usually	

Note.  $\bar{x}$  = Mean; SD = Standard Deviation. Source: Researchers (2023)

The findings above are corroborated by some previous studies in Nigeria. For instance, Oguizu and Celestine (2021) reported that 65.6% and 71.8% of the adolescents in Aba North Local Government Area consumed cakes and cookies (biscuits) every day, much like cake and cookies rank the third most consumed UPFs in this present study. Also, soft drinks, packaged breads, and instant noodles are consumed by 74.7%, 68.8%, and 59.9% of adolescents from time to time, respectively. In this present study, these three had the respective ranks of 7th, 2nd, and 6th. These findings are congruent with those of Otemuyiwa and Adewusi (2012).

The high prevalence of UPF consumption among undergraduate students in this study is consistent with broader trends in dietary habits among young people globally. The dominance of packaged snacks, often high in unhealthy fats, sodium, and added sugars, aligns with concerns raised by public health organisations worldwide. For instance, the Touvier et al. (2023) and Lane et al. (2024) have highlighted the role of unhealthy diets, characterised by excessive consumption of processed foods, as a major risk factor for chronic diseases such as obesity, heart disease, and type 2 diabetes.

### Research Question 2: What is the overall dietary pattern of undergraduate students in Ondo City?

The data analysed by this study shows the pattern of undergraduate students' diet in Ondo City. Table 5 indicate that more than half of undergraduate students in Ondo City (53%) do not take up to three meals in a day, though the response is close to the margin. Specifically, a huge proportion of them (70.3%) skips breakfast, more than half of the respondents said that they skip lunch (54.7%), while a very little proportion skip dinner (22%). Finally, they usually snack between meals (66.1%) and may drink up to three litres of water per day (56.8%). The standard deviation of their responses ranges from 0.415 to 0.500, showing that their responses cluster around the central tendency.

Table 5 Description of the Overall Dietary Pattern of Undergraduate Students in Ondo City

SN	Item	%Yes	%No	$\bar{x}$	SD	Decision
1	Take up to three meals per day	47.0	53.0	1.47	.500	No
2	Skip breakfast	70.3	29.7	1.70	.458	Yes
3	Skip lunch	54.7	45.3	1.55	.499	Yes
4	Skip dinner	22.0	78.0	1.22	.415	No
5	Snack between meals	66.1	33.9	1.66	.474	Yes
6	Drink up to three litres of water per day	56.8	43.2	1.57	.496	Yes

Note. % = Percentage;  $\bar{x}$  = Mean; SD = Standard Deviation. Source: Researchers (2023)

The findings of this study are close to those of Otemuyiwa and Adewusi (2012), who upon investigating the food choice and meal consumption pattern among undergraduate students in two universities in Southwestern Nigeria, reported that most students ate twice a day, substituting snacks for the third meal. Moreover, the dietary patterns observed in this study among undergraduate students in Ondo City are indicative of a broader trend of irregular meal consumption among young adults, particularly those engaged in higher education. Skipping meals, especially breakfast, has been associated with various health consequences, including impaired cognitive function, increased risk of obesity, and type 2 diabetes. A study by López-Gil et al. (2022) found that young individual who regularly skip breakfast tend to have higher body mass indexes and consume more unhealthy foods throughout the day.

The prevalence of snacking between meals highlights the importance of food choices in mitigating the negative impacts of irregular meal patterns. While snacking itself is not inherently unhealthy, the consumption of nutrient-poor snacks high in added sugars, unhealthy fats, and sodium can contribute to weight gain and chronic disease risk (Calcaterra et al., 2023). There is the need for healthier food environments that promote access to and consumption of nutritious snacks. The finding that a significant proportion of students consume at least three litres of water per day is encouraging, as adequate hydration is essential for overall health. However, it is important to consider the quality of the water consumed, as access to safe drinking water remains a challenge in many parts of the world, especially in Africa (World Health Organisation, WHO, 2023).

The present study provides valuable insights into the dietary habits of undergraduate students in Ondo City, but it is important to acknowledge its limitations. The cross-sectional design precludes drawing causal inferences about the relationship between meal patterns and health outcomes. Longitudinal studies are needed to investigate the long-term consequences of irregular meal consumption and inform the development of effective interventions.



### Research Question 3: What are the strategies to minimize the consumption of ultra-processed foods among undergraduate students in Ondo City?

This study identified some strategies for minimising the extent to which undergraduate students in Ondo City consume UPFs. Table 6 reveals that the topmost three strategies suggested by undergraduate students to minimise the consumption of ultra-processed foods among them are the organisation of public sensitisation programmes to educate students about the risks associated with the consumption of ultra-processed foods, the taking of personal responsibility by students to watch their diet and care for their health, and effective implementation of the government-made policies by agencies such as the Standard Organisation of Nigeria (SON) and the National Agency for Food and Drug Administration and Control (NAFDAC). The standard deviation of the responses ranged from 0.564 to 0.650, indicating that their responses are moderately dispersed from the central tendency.

Table 6 Mean and Standard Deviation of the Strategies to Minimise the Consumption of UPFS among Undergraduate Students in Ondo City

SN	Strategies	$\bar{x}$	SD	Rank	Decision
1	Legislative policies should be put in place to check the proliferation of ultra-processed foods.	3.45	.650	6	Agreed
2	The operations of agencies such as SON and NAFDAC should ensure the effective implementation of the government-made policies	3.55	.600	2.5	Agreed
3	Undergraduate students should take personal responsibility to watch their diet and care for their health	3.55	.564	2.5	Agreed
4	Food processing companies should be modest in their use of nutrient-depleting foods processing mechanisms	3.46	.650	5	Agreed
5	Advertising media should be truthful in their popularisation of ultra-processed foods	3.53	.581	4	Agreed
6	Food fortification and nutrients supplementation should be reasonably encouraged	3.40	.650	7	Agreed
7	Public sensitization programmes should be carried out to educate undergraduate students about the risks associated with the consumption of ultra-processed foods	3.57	.569	1	Agreed

Note.  $\bar{x}$  = Mean; SD = Standard Deviation. Source: Researchers (2023)

The findings of this study underscore the multifaceted approaches to addressing the challenge of excessive UPF consumption among undergraduate students. There is a strong endorsement of public sensitisation programs, which aligns with the growing recognition of the role of education in promoting healthy dietary behaviors (Scazzocchio et al., 2021). Targeted interventions can increase the awareness of the health risks associated with UPFs and empower individuals to make informed food choices.

This study also found an emphasis on personal responsibility among undergraduates for their diet and health, which is consistent with broader public health efforts to foster individual agency in health promotion (Personal Development, Health and Physical Education, PDHPE, 2024). It is, however, crucial to acknowledge that individual behaviours are shaped by the broader food environment. The availability and affordability of healthy food options, as well as effective food labelling, are essential for supporting healthy dietary choices of individuals.

The respondents in this study called for an effective implementation of government policies, highlighting the need for a coordinated approach to addressing the UPF challenge. Regulatory measures, such as those implemented in Brazil through the Dietary Guidelines (Mescoloto et al., 2017), can play a significant role in shaping the food environment and promoting healthier food options for young people. This is particularly important in the context of the global proliferation of ultra-processed foods, which often contain excessive amounts of added sugars, unhealthy fats, and sodium.

The foregoing findings of this study are in line with broader policy recommendations aimed at reducing UPF consumption. For example, the WHO (2024) has called for comprehensive strategies that address multiple levels of influence, including individual behaviour, social and environmental factors, and government policies. The moderate dispersion of responses to the proposed strategies suggests a need for further exploration of factors influencing the acceptability and effectiveness of different approaches. Conducting tailored interventions and longitudinal studies can help to evaluate the impact of interventions over time and identify factors that influence behaviour change.

**Research Hypothesis:** There is no significant correlation between the consumption of UPFs and the overall dietary pattern of undergraduate students in Ondo City.

The findings of this study, as presented in Table 7, show that there is a positive, significant but very low correlation between the consumption of UPFs and the overall dietary pattern of undergraduate students in Ondo City. Hence, the null hypothesis is rejected.

Table 7 PPMC of the Relationship between UPFs Consumption and Overall Dietary Pattern of Undergraduate Students in Ondo City

Variables	$\bar{x}$	SD	r	$\rho$	Decision
UPFs Consumption	57.87	14.064	.143	.029	Positive, significant but very low correlation
Consumption Pattern	9.17	1.062			

Note.  $\bar{x}$  = Mean; SD = Standard Deviation;  $\rho$  = Significance of correlation. Source: Researchers (2023)

The finding of a positive, yet weak, correlation between UPF consumption and overall dietary pattern among undergraduate students in this study is intriguing. The low magnitude of the significant relationship suggests that other factors may be mediatory or intervening in shaping dietary habits within this population. Such factors may include socioeconomic status, food availability, cultural influences, and individual preferences. This finding aligns with the complex interplay between various determinants of dietary behaviour outlined by the WHO (2024).

Similar studies have explored the relationship between UPF consumption and overall dietary quality. For example, a study by Fahimeh et al. (2022) found that higher consumption of UPFs is associated with poorer diet quality and lower nutrient intake among adolescents. The strength of this relationship may vary across different populations and cultural contexts. Similarly, the measured correlation does not imply causation. Further research, such as longitudinal studies, is needed to elucidate the underlying mechanisms and to determine the directionality of the relationship.

## Conclusion

This study concluded that the consumption of UPFs by undergraduate students in Ondo City is habitual; their consumption pattern is imbalanced; and there is a significant, albeit weak, positive relationship between the two. These findings indicate that the students' dietary habits are not conducive to optimal health.

## Recommendations

Based on the findings of this study, the following are recommended:

1. Legislative policies should be enacted to curtail the proliferation of ultra-processed foods.
2. The operations of agencies such as the Standard Organisation of Nigeria (SON) and the National Agency for Food and Drug Administration and Control (NAFDAC) should be strengthened to implement government nutrition policies.
3. Advertising media should accurately represent the nutritional value of ultra-processed foods.
4. Food processing companies should minimise the use of nutrient-depleting processing methods.
5. Public sensitisation programs should be organised to educate undergraduate students about the health risks associated with consuming ultra-processed foods.
6. Undergraduate students should prioritise healthy eating habits and personal well-being.
7. Food fortification and nutrient supplementation should be reasonably encouraged.


## Suggestions for Further Studies

Building upon the findings of this study, future research could explore the following:


1. The relationship between ultra-processed food consumption, consumption patterns, and the health status of undergraduate students in Ondo City or other regions.
2. The relationship between ultra-processed food consumption and consumption patterns among students of different age groups in Ondo City or other areas.

## Biographies

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## References

- Calcaterra, V., Cena, H., Rossi, V., Santero, S., Bianchi, A., & Zuccotti, G. (2023). Ultra-Processed Food, Reward System and Childhood Obesity. *Children* (Basel Switzerland), *10*(5), 804. <https://doi.org/10.3390/children10050804>
- Center for Epidemiological Studies in Health and Nutrition. (2016). *NOVA food classification system*. Brazil: School of Public Health, University of Sao Paulo. <https://tinyurl.com/NOVA2016WN>
- Costa-Louzada, M. L., Martins, A. P., Canella, D. S., Baraldi, L. G., Levy, R. B., Claro, R. M., Moubarac, J. C., Cannon, G., & Monteiro, C. A. (2015). Ultra-processed foods and the nutritional dietary profile in Brazil. *Revista de saude publica*, *49*, 38. <https://doi.org/10.1590/S0034-8910.2015049006132>
- Fahimeh, H., Parisa, H., Noushin, M., Farid, N., Hossein, F., Masoud, L., Toba, K., Simin, K., Shahin, S., Kamal, S., & Nizal, S. (2022). Association between ultra-processed foods consumption and micronutrient intake and diet quality in Iranian adults: A multicentric study. *Public Health Nutrition*, *26*(2):1-26. <https://doi.org/10.1017/S1368980022002038>
- Federal Ministry of Health. (2007). *Nigerian Code for Health Research Ethics (NCHRE)*. Abuja: National Health Research Ethics Committee. <https://bit.ly/3pk9ORh>
- Lane, M. M., Gamage, E., Du, S., Ashtree, D. N., McGuinness, A. J., Gauci, S., Baker, P., Lawrene, M., Rebholz C. M., Srour, B., Touvier M., Jacka, F. N., O'neil, A., Segasby, & Marx, W. (2024). Ultra-processed food exposure and adverse health outcomes: umbrella review of epidemiological meta-analyses *British Medical Journal*, *384*: e077310. <https://doi.org/10.1136/bmj-2023-077310>
- López-Gil, J. F., Sánchez-Miguel, P. A., Tapia-Serrano, M. Á., & García-Hermoso, A. (2022). Skipping breakfast and excess weight among young people: The moderator role of moderate-to-vigorous physical activity. *European Journal of Pediatrics*, *181*(8), 3195-3204. <https://doi.org/10.1007/s00431-022-04503-x>
- Management Information System (MIS). (2021). *Adeyemi Federal University of Education Students Population*. Unpublished.
- Mescoloto, S.B., Caivano, S., Duarte, M.H. & Domene, S.M.A. (2017). Dietary intake among university students: protective foods versus ultra-processed foods. *Demetra: Food, Nutrition & Health*, *12*(4); 979-992. <https://doi.org/10.12957/demetra.2017.29257>
- Monteiro, C.A., Cannon, G., Moubarac, J.C., Levy, R.B., Costa-Louzada, M.L., & Jaime, P.C. (2018). The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing. *Public Health Nutrition*, *21*, 5-17. <https://pubmed.ncbi.nlm.nih.gov/28322183/>
- Oguizu, A.D. & Celestine, E.U. (2021). Consumption of Ultra-Processed Foods and Anthropometric Status of Adolescents in Aba North LGA Abia State, Nigeria. *Nigerian Journal of Nutritional Sciences*, *42*(2). <https://www.ajol.info/index.php/njns/article/view/216800>
- Otemuyiwa, O.I., & Adewusi, S.R.A. (2012). Food choice and meal consumption pattern among undergraduate students in two universities in Southwestern Nigeria. *Nutrients and Health*, *21*(4):233-45. <https://10.1177/0260106013510994>.
- Personal Development, Health and Physical Education (PDHPE). (2024). Individuals. <https://pdhpe.net/better-health-for-individuals/what-strategies-help-to-promote-the-health-of-individuals/responsibility-for-health-promotion/individuals/>
- Richards, G. & Smith, A.P. (2015). The Diet and Behaviour Scale (DABS): Testing a new measure of food and drink consumption in a cohort of secondary school children from the South West of England. *Journal of Food Research*, *4*(3): 148-161. <http://doi.org/10.5539/jfr.v4n3p148>.
- Scazzocchio, B., Vari, R., d'Amore, A., Chiarotti, F., Del Papa, S., Silenzi, A., Gimigliano, A., Giovannini, C., & Masella, R. (2021). Promoting Health and Food Literacy through Nutrition Education at Schools: The Italian Experience with MaestraNatura Program. *Nutrients*, *13*(5), 1547. <https://doi.org/10.3390/nu13051547>
- Touvier, M., da Costa Louzada, M. L., Mozaffarian, D., Baker, P., Juul, F., & Srour, B. (2023). Ultra-processed foods and cardiometabolic health: public health policies to reduce consumption cannot wait. *BMJ (Clinical research ed.)*, *383*, e075294. <https://doi.org/10.1136/bmj-2023-075294>
- World Health Organisation (WHO). (2023). *Drinking water*. <https://www.who.int/news-room/fact-sheets/detail/drinking-water>
- World Health Organisation (WHO). (2024). *Behavioural sciences for better health*. <https://www.who.int/initiatives/behavioural-sciences>