



Demographic Differences in Ultra-Processed Foods Consumption, Dietary Pattern and Health Status of Undergraduate Students in Ondo City of Ondo State

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Abstract

This study aimed to investigate how gender, academic level, and field of study influence the consumption of ultra-processed foods (UPFs), consumption patterns, health status, and suggestions for reducing UPF consumption. Three null hypotheses were postulated for the study. Quantitative survey research design was adopted. A total of 240 undergraduate students in Ondo City responded to Ultra-Processed Foods, Consumption Pattern and Effects on Students' Health Questionnaire (UCPESHQ). The responses collected from the study shall be analyzed statistically, using Analysis of Variance (ANOVA) at 0.05 level of significance. Major findings were that male and female students differ significantly in their frequency of UPFs consumption (sig. = 0.008), and clinical features (sig. = 0.020); that junior and senior students differ significantly in their frequency of UPFs consumption (sig. = 0.013); and that non-science and science students differ significantly in their frequency of UPFs consumption (sig = 0.027), and perception about the strategies to minimise the consumption of UPFs (sig = 0.025). The study found that male, senior, and science students require increased nutrition education and intervention compared to their female, junior, and non-science peers. It is recommended that Nigerian universities consider student demographics in nutrition policy-making.

KEYWORDS: STUDENTS' LEVEL, STUDENTS' DISCIPLINE, STUDENTS' HEALTH STATUS, STUDENTS' SEXES, ULTRA-PROCESSED FOODS (UPFs)

Introduction

The consumption of ultra-processed foods (UPFs) and the dietary pattern of undergraduate students is troubling, from observation. Two studies were conducted earlier by the authors to describe the situations in reality, and the findings are thought-provoking. The first study concluded that the consumption of UPFs by undergraduate students in Ondo City is usual (habitual); that their consumption pattern is imbalanced; that the relationship between the two is significant and positive, though very low, indicating that the feeding habit of the students is not appropriate to ensure good health. The second study concluded that the health status of

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undergraduate students in Ondo City of Ondo State is far from perfect, though much of their ailments and worrisome clinical features are probably underreported. Also, a reasonable association was found between health on the one hand, and UPFs consumption and the dietary pattern of undergraduate students on the other hand. However, the concern that prompted this present study is the need to arrive at information that can aid specific interventions by University Management, government, and non-governmental organisations that have an interest in students' welfare, particularly their nutrition.

Data-driven decision-making is central to strategic management, particularly when administering the affairs of students undergoing formal tertiary education. The use of descriptive data is a limited approach to addressing pertinent issues relating to undergraduate students. The reason for this is not far-fetched. When the situation has been described, there remains the need to specify where the real problem lies, and the direction for the solution to be deployed. Hence, the demography of the population of interest is necessary for providing specifics for the perception of a situation at hand and proffering suitable solutions to it. Therefore, this present study examined the impact of gender, level, and discipline on the consumption of ultra-processed foods, consumption patterns, health status, and suggestions for strategies to minimize UPFs consumption. The first three variables are independent, while the last four are dependent.

Gender has been identified as a very crucial demographic detail in any given population. It refers to the cultural roles or identities associated with the sexes. In Nigerian society, there are only two genders - male and female - and they are the only two genders recognized in this study. The male is the gender associated with masculinity, strength, resilience, and determination, while the female gender is associated with virtues, humility, beauty, and tenderness. These qualities are expected to imply the consumption pattern of undergraduate students. Ajuzie et al. (2021) in a survey of public tertiary institutions in Oyo State found that the fat intakes of the respondents differ significantly by gender at 0.05 level of significance. The difference is not significant for calories, proteins, carbohydrates, fibre, vitamins, and minerals. Also, Otemuyiwa and Adewusi (2012) documented that more female undergraduate students consumed cereals, meat, fruits and vegetable, and milk in recommended amounts than their male counterparts (62%, 42%, 40%, 25% against 58%, 35%, 20% 10% respectively), while the reverse is the case for carbohydrate (35% against 50%). Rogowska (2019) documented that male undergraduates are more likely to abuse substances than females, and in a study conducted by Liu and Alias (2022) to test demographic differences in academic dishonesty among undergraduates from four public universities in China, it was discovered that, at 0.05 level of significance, male students cheat significantly more in examinations and assignments than female students.

Level as a demographic detail is peculiar to some populations, such as students and workers. Though it is not a yardstick for inequality, is a basis for social stratification. Among undergraduate students in Nigeria (and, indeed, globally), the academic level is usually upward and never downward. This means students cannot be demoted, rather, they move 100 level and upward the ladder. If they meet up to requirements, they are graduated; otherwise, they stay on the last stratum (usually, 400 level), for at most two extra sessions, until they fulfill the requirements. However, in this study, the levels of undergraduate students are grouped into two: junior and senior. The students in the 100 and 200 levels are regarded as junior students while the students in the 300 and 400 levels are regarded as senior students. Since level

perfectly correlates with the length of years spent on undergraduate programmes, it is expected to influence their experiences and their disposition towards consuming UPFs. Seedat and Pillay (2020) identified that the consumption of breakfast has a significant relationship with the level of study at 0.05 level of significance (with 208 students in the first and second years, as against 72 in the third and fourth years eating breakfast). Also, Liu and Alias (2022) discovered that, at 0.05 level of significance, senior students were significantly more involved in dishonest academic behaviours than sophomores or junior students.

Discipline refers to the academic field of inquiries and practice to which a person or group of persons belongs. For the sake of this study, academic fields are grouped into two: science-related and non-science-related. Science-related discipline entails those fields where the experimental scientific process is the procedure for discovering, verifying, and documenting truth, as well as reviewing itself. In this study, it included faculty (or school) of sciences and faculty (or school) of vocational and technical education. The non-science-related discipline entails the fields where truth is discovered and verified by processes other than experimental science, such as history, experience, authority, and so on. In this study, it includes faculty (or school) of education and faculty (or school) of languages. Hence, the respondents to this study are classes into two: science students and non-science students. It is assumed that the learning experiences as well as the tendency to live by objectivity should correspond with the disciplines of the learners. Particularly, science students are expected to be exposed to more nutrition education than their non-science counterparts and therefore should have better consumption patterns. A survey in South Africa by Seedat and Pillay (2020) on the breakfast consumption of undergraduate students in the School of Health Sciences at the University of KwaZulu-Natal, South Africa revealed that only a small portion of the respondent eat breakfast daily, concluding that they do not readily practice what they would end up preaching as health workers. While Rogowska (2019) documented that students studying social sciences are more likely to abuse substances than their counterparts in other disciplines, Liu and Alias (2022) discovered that, at 0.05 level of significance, Business students cheat insignificantly more in examinations and assignments than Engineering and IT students, and that both cheat insignificantly more than Education students.

Hence, this study seeks to examine the demographic differences in ultra-processed foods consumption, consumption pattern, and health status of undergraduate students in Ondo City of Ondo State, Nigeria.

Statement of the Problem

Observably, the graduates turned out by Nigerian universities are, often than not, partly developed. They are more likely to be more bookishly inclined and intellectually sound at their best, while other aspects of their lives such as their sociality, and physical as well as mental health are compromised. Since nutrition is recognized as a determinant of health, the efforts of the universities to produce holistically developed graduates cannot be productive if the nutrition of the students under training is not given adequate attention. Further from this, it is lamentable that there is almost no data to assist governing councils, management committees, and other relevant bodies in addressing the nutritional challenges of students. Hence, this study sought to provide empirical evidence to aid specific demography-based decisions about undergraduate students' health with particular respect to their UPFs consumption and dietary pattern.

Research Objectives

The main objective of this study is to measure the gender, level, and discipline differences in ultra-processed foods consumption and the health of undergraduate students in Ondo City, Ondo State. Specifically, the study tested the significance of the difference in the frequency of UPFs consumption, dietary pattern, health status, and perception of the strategies to minimize the consumption of ultra-processed food by

- 1) male and female undergraduate students respectively,
- 2) by junior and senior undergraduate students respectively, and
- 3) by science and non-science undergraduate students respectively.

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

There is no significant difference in the frequency of UPFs consumption, dietary pattern, health status, and perception of the strategies to minimize the consumption of ultra-processed food by

- 1) male and female undergraduate students respectively.
- 2) by junior and senior undergraduate students respectively.
- 3) by science and non-science undergraduate students respectively.

Research Design

The design for this study is quantitative inferential survey research design. It was based on earlier descriptive surveys that elicited information about the frequency of UPFs consumption, dietary pattern, the health status of undergraduate students, and the strategies to minimize the consumption of UPFs. The current design goes a step further by seeking to draw inference on the significance of the statistical differences that exist in the variables when some demographic details of the respondents are dichotomized.

Area of the Study

The study is being carried out in Ondo City. It is the headquarters of Ondo West Local Government Area of Ondo State. There are three degree-awarding institutions in the City, namely Adeyemi Federal University of Education (Federal Government owned), University of Medical Sciences (State-owned), and Wesley University (Private). The study was carried out in Adeyemi Federal University of Education, Ondo, which is the most populous, and representative of the other two institutions, at the time of conducting the study.

Population of the Study

The population of the study comprises students undertaking the regular Bachelor's Degree programmes in the institution. The population was estimated at 12,000 according to information sourced from the University's Management Information System (MIS, 2021).

Sample Size and Sampling Techniques

The sample size for the study comprised 2% of the estimated population. This amounted to 240 respondents. The respondents for the study were selected through multi-stage sampling to allow for the equitability of responses across demographic details. At the time of the study, the University comprised seven academic faculties, out of which four very populous and degree-awarding ones were randomly selected, such that two are science-oriented, while two are not. Purposive sampling technique was used to select an equal number of male and female students from each faculty, though this was not achieved because of the choky academic calendar. Finally, a stratified sampling technique was used to select respondents from the faculties based on the number of available research assistants (RAs) who were recruited across several academic levels.

Instrument for Data Collection

A thoroughly validated and reliable, seven-section, close-ended, structured questionnaire, titled Ultra-Processed Foods Consumption Pattern and Effects on Students' Health Questionnaire (UCPESHQ) was used for data collection. Ihensekhien and Oluwagbemileke (2024) described the process taken to validate and test the reliability of the instrument before it was used for data collection.

Method of Data Collection

Two hundred and forty (240) copies of questionnaire were produced and administered with the assistance of six (6) research assistants (RAs). Ihensekhien and Oluwagbemileke (2024) explained how the RAs were trained. The language of instruction was English. Only 98.3% of the administered instruments were retrieved.

Method of Data Analysis

The responses collected from the study shall be analyzed statistically, using Analysis of Variance (ANOVA). This yielded descriptive values (such as mean and standard deviation) for the several categories of the demography. Also, F and significance values were gotten. These were used to test the genuineness of the null hypotheses. The decision rule was that the F-value indicates the magnitude of the difference; and that if the significance value was less than the critical value (0.05), the difference is significant, and so the null hypothesis was accepted, otherwise, it was rejected.

Findings

Demography

The data of the respondents' genders, faculties, and levels are presented in pie charts as follows.

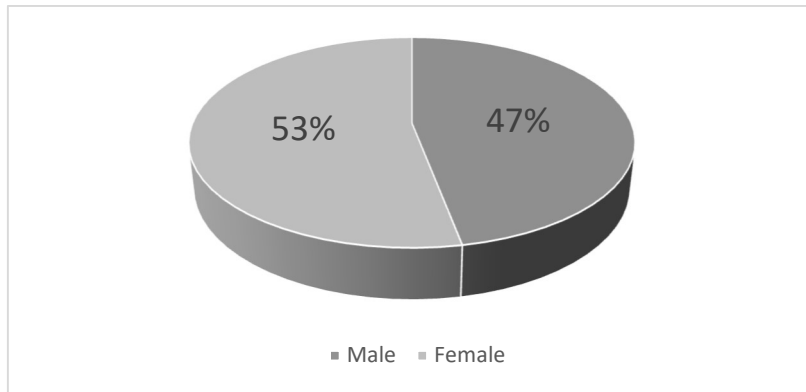


Figure 1 Demography of respondents by gender

Source: Field Survey (2023)

More respondents (53%) were female, while 47% of them were male.

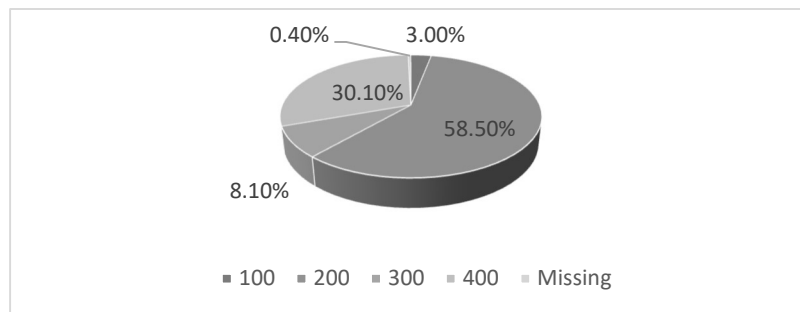


Figure 2 Demography of respondents by level

Source: Field Survey (2023)

In order of magnitude, the study examined students in 200 level (58.5%), 400 level (30.1%), 300 level (8.1%), and 100 level (3.0%). 0.4% of the respondents did not indicate their levels.

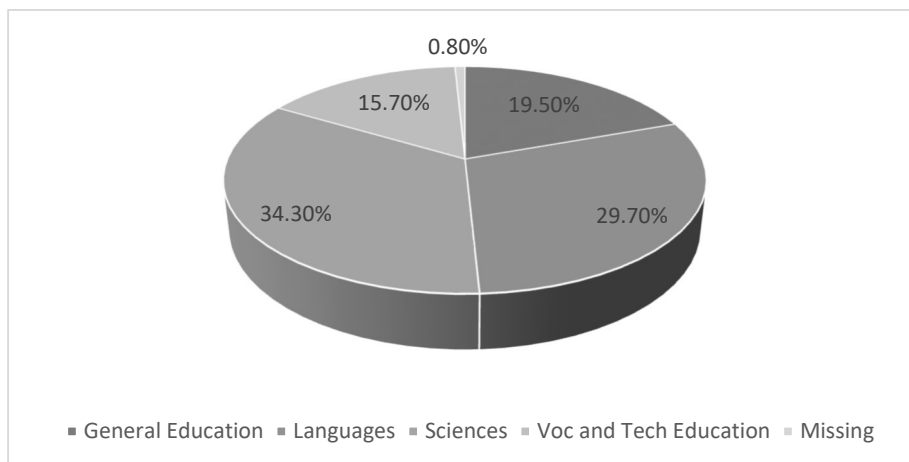


Figure 3 Demography of respondents by faculties

Source: Field Survey (2023)

In order of magnitude, the study examined students in the faculties of Sciences (34.3%), Languages (29.7%), General Education (19.5%), and Vocational and Technical Education (15.7%). 0.8% of the respondents did not indicate their faculties.

Research Hypotheses 1

There is no significant difference in the frequency of UPFs consumption, dietary pattern, health status, and perception of the strategies to minimize the consumption of ultra-processed food by male and female undergraduate students respectively.

Table 1 ANOVA analysis of differences in the dependent variables by gender

Dependent Variables	Independent Categories	N	\bar{X}	SD	df	F	Sig.	Decision
UPFs Consumption	Male	111	60.42	13.047	233	7.126	.008	Rejected
	Female	124	55.58	14.591				
	Total	235	57.87	14.064				
Dietary Pattern	Male	111	9.06	1.064	234	2.113	.147	Accepted
	Female	125	9.26	1.056				
	Total	236	9.17	1.062				
SRA	Male	111	9.57	1.405	233	.129	.720	Accepted
	Female	125	9.50	1.318				
	Total	236	9.53	1.357				
MDA	Male	111	7.24	.936	234	.139	.710	Accepted
	Female	125	7.21	.463				
	Total	236	7.22	.724				
CF	Male	111	13.48	1.026	234	5.464	.020	Rejected
	Female	125	13.81	1.134				
	Total	236	13.65	1.094				
BMI	Male	111	2.70	.721	234	.039	.844	Accepted
	Female	125	2.68	1.005				
	Total	236	2.69	.881				
Strategies to Minimise UPFs Consumption	Male	111	23.64	4.131	234	3.774	.053	Virtually accepted
	Female	125	24.54	2.911				
	Total	236	24.11	3.559				

Notes: N = number of respondents; \bar{X} = Mean; SD = Standard Deviation; df = degree of freedom, F = difference value; sig. = significance value; SRA = Self-Reported Ailments; MDA = Medically Diagnosed Ailments; CF = Clinical Features; BMI = Body Mass Index. Source: Field Survey (2023)

Table 1 above revealed that male and female students differ significantly in their frequency of UPFs consumption, with the former consuming more than the latter. Also, female students have significantly more worrisome clinical features than their male counterparts, and female students have a significantly more favorable perception of the strategies to minimise the consumption of UPFs than their male counterpart, though the statistical significance is almost halfway. However, the difference is not significant for their dietary pattern, self-reported ailments, medically diagnosed ailments, and body mass index.

Research Hypotheses 2

There is no significant difference in the frequency of UPFs consumption, dietary pattern, health status, and perception of the strategies to minimize the consumption of ultra-processed food by junior and senior undergraduate students respectively.

Table 2 ANOVA analysis of differences in the dependent variables by level

Dependent Variables	Independent Categories	N	\bar{X}	SD	df	F	Sig.	Decision
UPFs Consumption	Junior	144	56.04	13.613	232	6.309	.013	Rejected
	Senior	90	60.74	14.434				
	Total	234	57.85	14.092				
Dietary Pattern	Junior	145	9.23	1.078	233	1.274	.260	Accepted
	Senior	90	9.07	1.036				
	Total	235	9.17	1.063				
SRA	Junior	145	9.52	1.425	233	.110	.740	Accepted
	Senior	90	9.58	1.245				
	Total	235	9.54	1.356				
MDA	Junior	145	7.22	.768	233	.017	.897	Accepted
	Senior	90	7.23	.654				
	Total	235	7.23	.725				
CF	Junior	145	13.72	1.141	233	1.210	.273	Accepted
	Senior	90	13.56	1.018				
	Total	235	13.66	1.096				
BMI	Junior	145	2.76	.974	233	2.067	.152	Accepted
	Senior	90	2.59	.701				
	Total	235	2.69	.882				
Strategies to Minimise UPFs Consumption	Junior	145	24.15	2.863	233	.007	.932	Accepted
	Senior	90	24.11	4.458				
	Total	235	24.14	3.550				

Notes: N = number of respondents; \bar{X} = Mean; SD = Standard Deviation; df = degree of freedom, F = difference value; sig. = significance value; SRA = Self-Reported Ailments; MDA = Medically Diagnosed Ailments; CF = Clinical Features; BMI = Body Mass Index. Source: Field Survey (2023)

Table 2 above revealed that junior and senior students differ significantly in their frequency of UPFs consumption, with the latter consuming more than the former. However, the difference is not significant for their dietary pattern, health status (self-reported ailments, medically diagnosed ailments, clinical features, and body mass index), and strategies to minimize UPFs consumption.

Research Hypotheses 3

There is no significant difference in the frequency of UPFs consumption, dietary pattern, health status, and perception of the strategies to minimize the consumption of ultra-processed food by non-science and science undergraduate students respectively.

Table 3 ANOVA analysis of differences in the dependent variables by discipline

Dependent Variables	Independent Categories	N	\bar{X}	SD	df	F	Sig.	Decision	
UPFs Consumption	Non-science	115	55.70	13.845	231	4.925	.027	Rejected	
	Science	118	59.76	14.063					
	Total	233	57.76	14.073					
Dietary Pattern	Non-science	116	9.25	1.102	232	1.137	.287	Accepted	
	Science	118	9.10	1.024					
	Total	234	9.18	1.064					
Health Status	SRA	Non-science	116	9.65	1.422	233	1.584	.209	Accepted
		Science	118	9.42	1.284				
		Total	234	9.53	1.356				
	MDA	Non-science	116	7.19	.558	232	.590	.443	Accepted
		Science	118	7.26	.862				
		Total	234	7.23	.727				
	CF	Non-science	116	13.53	.973	232	2.796	.096	Rejected
		Science	118	13.76	1.182				
		Total	234	13.65	1.088				
BMI	Non-science	116	2.66	.722	232	.172	.679	Accepted	
	Science	118	2.71	1.022					
	Total	234	2.69	.884					
Strategies to Minimise UPFs Consumption	Non-science	116	24.65	3.487	232	5.111	.025	Rejected	
	Science	118	23.60	3.581					
	Total	234	24.12	3.566					

Notes: N = number of respondents; \bar{X} = Mean; SD = Standard Deviation; df = degree of freedom, F = difference value; sig. = significance value; SRA = Self-Reported Ailments; MDA = Medically Diagnosed Ailments; CF = Clinical Features; BMI = Body Mass Index. Source: Field Survey (2023)

Table 3 above revealed that non-science and science students differ significantly in their frequency of UPFs consumption, with the latter consuming more than the former. Also, non-science students have a significantly more favorable perception of the strategies to minimise the consumption of UPFs than science students. However, the difference is not significant for their dietary pattern, self-reported ailments, medically diagnosed ailments, and body mass index.

Discussion of Findings

When the first null research hypothesis was tested at 0.05 level of significance, it was discovered that male and female students differ significantly in their frequency of UPFs consumption, with the former consuming more than the latter. Otemuyiwa and Adewusi (2012) documented that more female students consumed healthy foods than their male counterparts. Also, female students have significantly more worrisome clinical features than male, and female students have a significantly more favorable perception of the strategies to minimise the consumption of UPFs than male, though the statistical significance is almost halfway. The findings of Liu and Alias (2022) credited female students than the male with more tendency for

positive values. However, the difference is not significant for their dietary pattern, self-reported ailments, medically diagnosed ailments, and body mass index.

When the second null research hypothesis was tested at 0.05 level of significance, it was found that junior and senior students differ significantly in their frequency of UPFs consumption, with the latter consuming more than the former. Similarly, Liu and Alias (2022) posited that senior students are more likely to be engaged in negative habits such as academic dishonesty. Furthermore, the present study found that the difference between levels is not significant for their dietary pattern, health status (self-reported ailments, medically diagnosed ailments, clinical features, and body mass index), and strategies to minimise UPFs consumption. However, Seedat and Pillay (2020) identified junior students consume breakfast more than senior students.

The test of third null hypothesis was tested at 0.05 level of significance revealing that non-science and science students differ significantly in their frequency of UPFs consumption, with the latter consuming more than the former. This is opposed to the findings of Rogowska (2019) that students studying social sciences (non-science) are more likely to abuse substances than others. Also, non-science students have a significantly more favorable perception of the strategies to minimise the consumption of UPFs than science students. This finding is somewhat similar to that of Liu and Alias (2022) who studied the level of students' academic dishonesty according to their discipline. On the other hand, in the present study, the difference is not significant for their dietary pattern, self-reported ailments, medically diagnosed ailments, and body mass index.

Conclusion

This study concluded that male, senior, and science students need more nutrition education and intervention programmes than their female, junior and non-science counterparts respectively.

Recommendations

Based on the findings of this study, the following recommendations were made.

- 1) Nigerian University Commission (NUC) and the respective Governing councils of Nigerian Universities should place more priority on the demography of undergraduate students when making policies about their nutrition and nutrition education.
- 2) The management committees of Universities should implement policies that will aid good nutrition among undergraduate students.
- 3) Non-governmental organisations who have an interest in students' welfare should make good nutrition, and not just food sharing their focus.
- 4) Divisions of Student Affairs in Universities should lay emphasis of good nutrition by undergraduate students, especially the male.


Suggestion for Further Studies

Scholars may consider carrying out further studies related to this study by investigating the:


- 1) factors responsible for students' consumption of ultra-processed foods (UPFs) among undergraduate students.
- 2) impact of free-feeding scheme on students' health.

Biographies

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