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Knowledge of Health Risks and Dietary Control Practices Related to Ultra-processed Food Consumption among Tertiary Students in Nsukka Enugu State, Nigeria

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Abstract

The rising consumption of ultra-processed foods (UPFs) among young adults poses significant public health concerns due to their association with chronic diseases such as obesity, diabetes, cardiovascular conditions, and certain cancers. This study assessed the knowledge of health risks and dietary control practices related to ultra-processed food consumption among Tertiary Students in Nsukka Enugu State, Nigeria .A cross-sectional survey design was adopted, involving a representative sample of students from selected tertiary institutions. Data were collected using a 22-item structured multiple choice test scale covering Knowledge of Health Risks and Dietary Control Practices Related to Ultra-processed Food Consumption (KHRDCP). A total number of 380 tertiary students drawn using stratified random sampling technique participated. Descriptive statistics of frequency and percentage, and inferential statistics of chi-square statistics ($p \leq .05$) were used for analyses. The results revealed that tertiary students had high knowledge of health risks (65.3%) and adopted good dietary control practices (96.1%) related to ultra-processed food consumption. Gender was significantly associated with the knowledge of health risks and dietary control practices of ultra-processed food consumption ($p < .05$). Year of study was not significantly associated with the knowledge of health risks and dietary control practices of ultra-processed food consumption ($p > .05$). The study underscores the need for targeted nutrition education and the promotion of healthy eating environments within tertiary institutions. These findings can inform policies and intervention programmes aimed at reducing UPF consumption and improving dietary habits among tertiary students in Nigeria.

Keywords: Ultra-processed food consumption, Knowledge, Health risks, Dietary control practices, Tertiary students

Introduction

The consumption of ultra-processed foods has become a growing concern globally, particularly among young adults, including tertiary students. These foods are often high in unhealthy ingredients, added sugars, and saturated fats, which can lead to various health problems. In recent decades, the global food landscape has experienced a major shift due to industrialization and urbanization, leading to the widespread availability and consumption of ultra-processed foods (UPFs). Dietary habits have changed in recent decades. One of the most significant changes is that ultra-processed foods are pushing aside all other food groups to dominate global diets (World Obesity Federation, 2024).

Globally, it was found that United States and the United Kingdom were the countries with the highest percent energy intake from UPF (generally >50%), whereas Italy had the lowest levels (about 10%) (Marino et al., 2021). World Obesity Federation (2024) further revealed

that UPF now provide near or more than half of the calories in diets in developed countries such as Canada (47%) the USA (60%) and the UK (57%), with lower but increasing proportions in middle-income countries such as Brazil (20%). Ultra-processed foods (UPFs) are becoming more present in all food categories, even in infants, children's and adolescents' diets (Baker et al., 2020).

In Nigeria, especially among young adults in urban and semi-urban areas, there has been a marked increase in the consumption of UPFs. Tertiary institutions such as those in Nsukka, Enugu State, host thousands of students who often rely on UPFs due to their convenience, affordability, and perceived taste appeal. Students facing academic pressures, limited cooking facilities, and financial constraints are particularly vulnerable to poor dietary choices that favor ultra-processed foods. A study conducted by Oyebode et al. (2016) revealed that the consumption of ultra-processed foods in Nigeria has been increased rapidly in recent years; between 2008 and 2018, and the proportion of ultra-processed foods in Nigerian diet increased from 24.2 per cent through 33.2 per cent. Moreover, Oguizu and Udochukwu (2024) reported that instant noodles were consumed by 53.8 per cent 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%). However, the rising consumption of UPFs has been strongly linked to various non-communicable diseases (NCDs) including obesity, hypertension, type 2 diabetes, and cardiovascular diseases. Globally, studies have shown that excessive intake of UPFs is associated with metabolic syndrome and early-onset health complications. Despite this, the level of awareness and understanding of these health risks among Nigerian university students remains poorly documented.

Ultra-processed foods are industrial formulations typically made from refined ingredients and additives, such as artificial flavours, colours, preservatives, sweeteners, and emulsifiers, with little or no intact whole foods. Examples include sugary beverages, instant noodles, packaged snacks, processed meats, and fast foods. Ultra-processed Food are a category of food that undergo a series of industrial processes such as extrusion and moulding, and have presence of classes of additives whose function is to make the final product palatable or more appealing, such as flavours, flavour enhancers, colours, emulsifiers, thickeners, sweeteners among others (Ghosh-Jerath et al., 2024). Thus, adequate knowledge of its health risks is paramount.

Knowledge is familiarity, awareness or understanding of something such as facts, information, description or skill which is acquired through experience or education (Agu et al., 2015). The role of knowledge and information in the process of performing certain practices conducive for improved health has gained increased recognition. Hence there is need to make the tertiary students to acquire information or the knowledge of health risks of ultra-processed foods and adopt good dietary control practices, especially tertiary students in Nsukka Local Government Area, Enugu State.

Moreover, knowledge does not always translate into healthy practices. Even when some students are aware of the negative health implications of UPFs, many do not engage in effective dietary control measures such as reading food labels, moderating intake, or choosing healthier alternatives among others. This disconnects between knowledge and practice raises significant public health concerns. Dietary risk factors are leading contributors to the global burden of disease (GBD), responsible for an estimated 11 million deaths from non-communicable diseases (NCDs) (22% of all adult deaths) and 15 per cent of disability life

years (DALYs) lost in 2017 (Afshin et al., 2017). In view of health consequences of UPF consumption, dietary control practices hold the key to curbing these effects, especially among adolescents and adults.

Dietary control practices are actions and or activities that are taken to prevent, eliminate or reduce the occurrence of a hazard that you have identified. This could include steps to increase knowledge regarding the effects of ultra-processed food consumption. Control measures are actions or strategies implemented to manage, mitigate, or minimize the risks or negative impacts associated with a particular situation or phenomenon (Singh et al., 2020). These include checking food labels for ingredients, sugar content, and nutritional information to make informed choices, prioritizing whole, unprocessed foods such as fruit, vegetables, whole grains, lean proteins, and healthy fats, preparing meals at home allows for better control over ingredients and cooking methods, trying to limit or avoid packaged snacks, which are often high in unhealthy ingredients among others.

The increasing consumption of ultra-processed foods among tertiary students in Nsukka poses a significant and growing public health challenge. While these foods are often readily available and affordable for students, they are also major contributors to poor nutritional quality and long-term health risks. The transition from traditional diets to diets dominated by UPFs is particularly evident among university students who may lack adequate nutrition education and face environmental and economic constraints. Despite the potential health risks, many tertiary students in Nsukka, Nigeria, may lack adequate knowledge about the dangers of ultra-processed food consumption and may not adopt healthy dietary practices.. There is limited empirical data on the level of knowledge of health risks, and dietary control behaviour of tertiary students in Nsukka regarding UPFs. It remains unclear to what level these students understand the health implications of their dietary choices and what practices they adopt to control their intake of these products. Specifically, the study determined the level of knowledge of health risks and dietary control practices related ultra-processed food consumption among tertiary students; across the socio-demographic variables of gender and year of study.

This knowledge gap hampers the development of effective health promotion strategies and interventions targeted at young adults in tertiary institutions. Therefore, there is a pressing need to assess students' knowledge of the health risks associated with UPFs and to evaluate the dietary control practices they employ. Such research is essential for informing university health policies, nutrition education programmes, and broader public health strategies aimed at improving student well-being and preventing diet-related diseases.

Materials and Methods

Study design and setting

An institutional-based cross-sectional study was conducted between June and July at various designated tertiary institution in Nsukka Local Government Area (LGA), Enugu State. Nsukka LGA shares boundaries with Igbo-Eze South LGA on the North, Kogi State on the

North West and West, Udenu LGA on the North East, Isi-Uzo LGA on the East, and Igbo-Etiti LGA on the South. The area was chosen for the study due to the fact that tertiary students find it difficult to consume enough home-cooked meals. Hence, these students turn to processed/manufactured foods as these foods are highly palatable and convenient. There appears to be a high consumption of ultra-processed foods among tertiary institution.

Participants

The study participants consisted of tertiary students in the study area. The total number of tertiary students in the study area is 28,828, comprising 24,458 from University of Nigeria Nsukka; 190 From Bishop Shanahan School of Nursing; 480 from School of Health Technology and 3,700 from Federal College of Education Nsukka, as at the time of the study. Only tertiary students in different institutions, who are in good health and had no terminal health challenges and expressed their consent in responding to the questionnaires, were included in the study population.

Sampling procedures

The sample size was 380 tertiary students. The sample size was determined using Cohen et al. (2018), which stipulated that when a population size is 20,000 or above at 95 per cent confidence level (5% interval), the sample size should be 377 and above. The stratified random sampling and convenience sampling techniques were employed to draw the sample size for the study. The stratified random sampling technique was used to draw the sample size for the study. The tertiary institutions in Nsukka LGA were stratified into four strata. The first stratum was University of Nigeria Nsukka with a population of 24,458. The second stratum was the College of Education Nsukka, with a population of 3,700. The third stratum was College of Nursing Science and Health Technology Nsukka, with a population of 480. The fourth stratum was School of Nursing, Bishop Shanahan Hospital, Nsukka, with a population of 190. The proportional stratified sampling technique was used to draw 322 students from University of Nigeria Nsukka, 49 students from Federal College of Education Nsukka, six students from College of Nursing Science and Health Technology Nsukka, and three students from School of Nursing, Bishop Shanahan Hospital, Nsukka. Hence 380 tertiary students were drawn for the study.

Measures

Data collection was done using a 22-item structured multiple choice scale covering Knowledge of Health Risks and Dietary Control Practices Related to Ultra-processed Food Consumption (KHRDCP). The Scale consists of three parts: Part I consists of two socio-demographic variables of gender and year of study .Part II consists of 10 items on the Knowledge of health risks, while part III consists of 10 items on dietary control practices related to ultra-processed food consumption, with multiple choice questions of four lettered options (A-D).

Face and content validity of the questionnaire was evaluated by a professional board of three experts in public health education and nutrition, as well was tested for internal consistency. The instrument yielded internal consistency (reliability) indices of 0.845 for Knowledge of health risks scale, and .791 for dietary control practices scale, using Split-half (Spearman's Brown Coefficient).

Data collection procedure

This research was developed in accordance with the Ethical Principles of the World Medical Association Declaration of Helsinki for medical research involving human subjects (World

Declaration of Helsinki, 2022; World Medical Association, 2013), and the research was approved by the Research Ethics Committee of the Faculty of Education, University of Nigeria, Nsukka (UNN/FE/REC23/0043).

After obtaining permission from the Academic Planning Director/Registrar of each of the four tertiary institutions selected. The concerned directors in turn introduced the researchers to their subjects. The researchers explained the objectives of research to the participants and they were reassured that their responses are confidential and no personal identifiers will be disclosed. The questionnaire was administered with the aid of well-trained interviewers. Participants filled out the questionnaires individually and it was only done once. The questionnaires were collected back immediately after filling out in order to ensure maximum return rate. A total number of 380 questionnaires were administered in the process, out of which 367 copies were returned, yielding a return rate of 96.6 per cent, and 13 copies were not returned. Out of the returned copies, seven were not duly filled out. Only 360 questionnaires duly filled out were used for analyses.

Data analysis

Afterwards, the returned questionnaires were sorted and cleaned. The analyses were performed using the IBM Statistical Package for Social Sciences (SPSS) software package, version 25. The standard descriptive statistics of frequency and percentage were applied to describe the data patterns. Knowledge score was determined based on responses from 10 knowledge-based items. Each correct response attracted one point, while a wrong response attracted no point. Therefore, the knowledge scores were interpreted as follows; low (0-3), moderate (4-6), and high (7-10). By this, the level of knowledge was determined by the highest percentage score for either of the three levels (low, moderate, and high). This procedure was followed by Perumal et al. (2013) to interpret level of knowledge in their study. Dietary control practice score was determined based on responses from 10 items. Each correct response attracted one point, while a wrong response attracted no point. Therefore, the dietary control practices scores were interpreted as follows: poor (0-5) and good (6-10). By this, the level of practice was determined by the highest percentage score for either of the two levels (poor and good). This procedure was followed by Upashe et al. (2015) to interpret level of practice and knowledge in their study. Chi-square statistics was used to test null hypothesis at 0.05 level of significance. All tests were 2-tailed, and probability values less than or equal to 0.05 ($p \leq 0.05$) were considered significant.

Results

Table 1**: Frequency Table of Socio-demographic Characteristics of Tertiary Students**

Variables	Frequency	Per cent
Gender		
Male	174	48.3
Female	186	51.7
Total	360	100.0
Year of Study		
Less than #50,000	106	29.4
#50,000 - #99,000	122	33.9
#100,000 +	132	36.7
Total	360	100.0

The socio-demographic characteristics of the participants in this study are presented in Table 1. The final sample was 360; comprising 174 (84.3%) male and 186 (51.7%) female tertiary students in Nsukka LGA, Enugu State, Nigeria. The vast majority of the respondents 254 (70.6%) are found in second year through final year.

Table 2: **Responses on Knowledge of Health Risks of Ultra-processed Food Consumption among Tertiary Students (*n*=360)**

S/N	Items	f (%)
1	Regular consumption of ultra-processed foods contributes to weight gain and obesity	313 (86.9)
2	Ultra-processed foods consumption is associated with an increased risk of certain types of cancer	298(82.8)
3	Over consumption of ultra-processed foods results to negative health effects (e.g. digestive discomfort, headaches, fatigue)	283 (78. 6)
4	Ultra-processed food consumption contributes to increased poor mental health (e.g. depression, anxiety and poor memory)	163 (45.3)
5	Ultra-processed foods contain high levels of added sugar, sodium, and unhealthy fats which contribute to heart disease	315 (87. 5)
6	Ultra-processed foods are often low in essential nutrients such as vitamins, minerals, and fiber which contribute to hypertension and cholesterol	273 (75.8)
7	Ultra-processed food consumption results to type 2 diabetes and obesity	217 (60. 3)
8	Ultra-processed foods contribute to higher mortality rates	288 (80.0)
9	Ultra-processed foods can lead to hormonal imbalances	220 (61.1)
10	Ultra-processed food consumption result to kidney disease	254 (70.6)
	Knowledge summary index	
	Low Knowledge (0-3)	24 (6.7)
	Moderate Knowledge (4-6)	101 (28.1)
	High Knowledge (7-10)	235 (65.3)

Table 2 shows that tertiary students had high (65.3%) knowledge of health risks of ultra-processed food consumption.

Table 3: **Responses on Dietary Control Practices Related to Ultra-processed Food Consumption among Tertiary Students (*n*=360)**

S/N	Items	f (%)
1	Banning schools from selling ultra-processed foods in schools' cafeteria to reduce its consumption	255 (70.8)
2	Checking food labels for ingredients, sugar content, saturated fat, sodium, and nutritional information to make informed choices.	292 (81.1)
3	Cooking meals at home using fresh and whole ingredients, which allows for better control over ingredients and cooking methods.	329 (91.4)
4	Clearly identifying the amount of sugar, salt and unhealthy fats in ultra-processed food products will put one in check	311 (86.4)
5	Drinking more water which helps to reduce the consumption of ultra-processed foods	198 (55.0)
6	Banning ultra-processed foods from being sold in tertiary institution by food vendors	247 (68.8)
7	Educating parents on the negative impacts of ultra-processed foods	333 (92.5)
8	Limiting or avoiding packaged snacks, which are often high in unhealthy ingredients	292 (81.1)
9	Implementing higher taxes by the government on ultra-processed foods being sold in institutions	246 (68.3)
10	Prioritizing whole, unprocessed foods such as fruit, vegetables, whole grains, lean proteins, and healthy fats.	326 (90.6)
	Practice summary index	
	Good practice (6-10)	346 (96.1)
	Poor practice (0-5)	14 (3.9)

Table 3 shows that majority (96.1%) of tertiary students adopt good dietary control practices related to ultra-processed food consumption, while 3.9 per cent adopt poor dietary control practices .

Table 4: **Chi-square Test of Association between Knowledge of Health Risks of Ultra-processed Food Consumption Overall among Tertiary Students and Covariates**

Variables	N	Low Knowledge	Moderate Knowledge	High Knowledge	χ^2 (p)
Gender					12.87 (.000*)
Male	174	20 (11.5)	57 (32.8)	97 (55.7)	
Female	186	4 (2.2)	44 (23.7)	138 (74.2)	
Year of study					1.090 (.580)
First year	106	12 (11.3)	27 (25.5)	67 (63.2)	
Other year	122	5 (4.1)	4 1(33.6)	76 (62.3)	
Final year	132	7 (5.3)	33 (25.0)	92 (69.7)	

Key: N = Number of Participants; *Significant at p≤ 0.05

Table 4 shows that female tertiary students had high (74.2%) knowledge of health risks of ultra-processed food consumption more than the male students (55.7%).. Also there was a

significant association between the knowledge of health risks of ultra-processed food consumption and gender (χ^2=12.871,df=1 ,p=.000<0.05).

Further, the Table shows that final year tertiary students had high (69.7%) knowledge of the health risks of ultra-processed food consumption more than the first year (63.2%) and other year students (62.3%). Also, there was no significant association between the knowledge of health risks of ultra-processed food consumption and year of study (χ^2=1.090, df=2, p=.580>0.05).

Table 5: **Chi-square Test of Association between Dietary Control Practices Related to Ultra-processed Food Consumption Overall among Tertiary Students and Covariates**

Variables	N	Good Practice	Poor Practice	χ^2 (p)
Gender				5.333 (.021*)
Male	174	163 (93.7)	11 (6.3)	
Female	186	183 (98.4)	3 (1.6)	
Year of study				3.134 (.209)
First year	106	99 (93.4)	7 (6.6)	
Other year	122	118 (96.7)	4 (3.3)	
Final year	132	129 (97.7)	3 (2.3)	

Key: N = Number of Participants; *Significant at p≤ 0.05

Table 5 shows that female tertiary students (98.4%) adopt good dietary control practices related to ultra-processed food consumption more than the male students (93.7%). Also there was a significant association between the dietary control practices related to ultra-processed food consumption and gender (χ^2=5.333,df=1,p=.021<0.05).

Further, the Table shows that final year tertiary students (97.7%) adopt good dietary control practices related to ultra-processed food consumption more than other year students (96.7%) and the first year (93.4%). Also, there was no significant association between the dietary control practices related to ultra-processed food consumption and year of study (χ^2=3.134, df=2,p=.209>0.05).

Discussion

The study showed that the final sample was 360; comprising 174 (84.3%) male and 186 (51.7%) female tertiary students in Nsukka LGA, Enugu State, Nigeria. The vast majority of the respondents 254 (70.6%) are found in second year through final year (Table 1). Tertiary institution students had high knowledge of the health risks of ultra-processed food consumption (Table 2). The result was expected and therefore, not surprising because tertiary institutions often offer nutrition and health-related courses as part of their programmes. These courses provide students with in-depth knowledge about various aspects of food including processed and ultra-processed food health risks to health through lectures, research assignments, and practical experiences. Also, it could be due to internet and media exposure. Tertiary institution students are often avid internet users and are exposed to a vast amount of online information related to food and nutrition. The findings were in line with ElGilany et al. (2016) who found that majority of the respondents stated that fast foods were hazardous to health with obesity as the most frequent hazard. Also, the finding was in line with Chopera (2018) who reported that 75 per cent of the respondents had high awareness that fast meals

are not healthy. However, the findings conflicts with the results obtained from a study conducted by Subedi et al. (2020) who found that the students had poor level of knowledge regarding harmful effects of junk food consumption. Hence, there is need to improve the knowledge of ill-effects of junk food among adolescents to avoid effects such as obesity and vascular disorders. The findings may be as a result of many factors including health education programmes, access to reliable information sources such as reputable websites and educational materials which helps students to access accurate information about the consequences of consuming ultra-processed foods. Also, conversations, debates, and sharing of personal experiences aid in disseminating awareness and prompt further exploration of this topic. The findings have implication for health professionals in sensitizing tertiary institution students and the public about the practical application of their knowledge of health risks of ultra-processed food consumption.

Majority of Tertiary students adopt good dietary control practices related to ultra-processed food consumption (Table 3). The findings were not surprising and therefore, expected because media, health campaigns and teachings have made it easier to access information regarding ways to improve one's eating patterns of extensively processed foods to minimally processed foods. The findings were in consonance with Yadav and Kaur (2019) who found that adolescents have average level of knowledge regarding health hazards of junk food and its prevention. The finding was not in consonance with Fondevila et al. (2022) who found that university students do not read labels 64 per cent and find it difficult to identify the degree of wholesomeness of what they consume. The implication of this is poor knowledge of the importance of reading food labels. A great percentage of tertiary students may find it difficult to read and understand food labels. The findings have implications for food manufacturers in improving transparency, easily understandable labels and proving accurate information about the nutritional content of their products.

Female tertiary institution students had high knowledge of health risks of ultra-processed food consumption more than the male students. Also there was a significant association between the knowledge of health risks of ultra-processed food consumption and gender. Further, final year tertiary institution students had high knowledge of the health risks of ultra-processed food consumption more than the first year and other year students Also, there was no significant association between the knowledge of health risks of ultra-processed food consumption and year of study (Table 4). The results were expected and therefore not surprising because a study by Didarloo et al. (2022) found that female students tend to have greater nutritional awareness and health literacy than their male counterparts. The findings were however consistent with Gaikwad et al. (2024) who revealed that significantly higher proportion of female students demonstrated adequate knowledge about the health impacts of fast food compared to male students. However, the findings that female tertiary institution students had high 74.20 per cent knowledge of the health risks of ultra-processed food consumption more than the male students is surprisingly expected not to be inconsistent. This finding also agreed with the findings of Subedi et al. (2020) who found a significant association of students' gender with the level of knowledge regarding harmful effects of junk food consumption.

Further, the findings that final year tertiary students had high knowledge of the health risks of ultra-processed food consumption more than the first year and other year students is expected and not surprising due to the fact that final year students have spent more time in the academic environment, gaining exposure to relevant coursework, scientific research, and practical learning experiences. As students progress through their academic journey, they

typically develop stronger critical thinking skills, engage more deeply with subject-specific content, and participate in seminars, projects, or internships that enhance their understanding of health and nutrition. Also, final year students may have completed specialized modules or research projects related to food science, public health, or diet-related diseases, further enriching their knowledge base. In contrast, first-year students are still building foundational knowledge and may not yet have been introduced to in-depth topics related to ultra-processed foods and their health implications. Thus, the knowledge gap is both logical and developmentally appropriate. The findings were not in consonance with Gaikwad et al. (2024) who identified higher proportion of first year students demonstrated satisfactory knowledge, but fewer maintained healthy eating practices. Furthermore, this trend mirrors the observations by Dowarah et al. (2020) who reported that while younger students start with greater enthusiasm for healthy eating. These practices tend to diminish over time due to increased academic exposure. These findings are surprisingly expected to be consistent. The inconsistency of the findings may be because of the various type of food being consumed. However, the findings were not consistent with Kokilaa et al. (2023) who revealed a statistically significant association between the students' year of study and their knowledge score. This could be attributable to the study findings because of the adoption of similar research designs and methods, including social environmental factors. The findings have implications for all tertiary students and health professionals in creating awareness and promotion campaign on implementation of practical healthy eating patterns.

Female tertiary students adopt good dietary control practices related to ultra-processed food consumption more than the male students.. Also there was a significant association between the dietary control practices related to ultra-processed food consumption and gender. Further, final year tertiary students adopt good dietary control practices related to ultra-processed food consumption more than other year students and the first year. Also, there was no significant association between the dietary control practices related to ultra-processed food consumption and year of study (Table 5). The findings were not surprising and therefore, expected because societal expectations and cultural influences often place a greater emphasis on women's appearance and body image compared to men. Consequently, female students may be influenced by cultural and social messages regarding the importance of healthy eating and may therefore be more proactive in adopting good dietary control practices related to consumption of ultra-processed foods. The findings were not line with Yadav and Kaur (2019) who found no significant association practices and level of knowledge regarding health hazards of junk food and its prevention. However, the findings that female tertiary students adopt good dietary practices related to ultra-processed food consumption more than the male students is surprisingly expected to be consistent. The inconsistency of the findings may be because of the slight variation on the various type of food, and this could be attributable to the dissimilarity in the culture of setting where these studies were conducted as well as the peddling network which is in existence.

The findings that final year tertiary students adopt good dietary control practices related to ultra-processed food consumption more than first year and other year students, and no significant association exist between the dietary control practices related to ultra-processed food consumption and year of study is not expected because over the course of academic journey, students typically build upon their knowledge and deepen their understanding of subject matters. As students move from their first year to their final year in tertiary education, they are exposed to advanced coursework and may have had prior education and experiences related to nutrition and health. The findings are not in line with Karthiga and Kamalahe (2021) who found inadequate level of knowledge and practices regarding junk food among

hiigh school students. The findings have implications for food manufacturers in improving transparency and providing clear and accurate information about the nutritional content of their products, which should influence adopting good dietary practice that would improve the health of stuidents.

Implications for Health Eating

The high level of knowledge among tertiary students is a positive indicator for public health efforts aimed at addressing the challenges posed by ultra-processed food consumption. It suggests that educational initiatives are having an impact, particularly among a demographic that is transitioning into independent living and decision-making. The significant gender disparities highlight the need for health interventions that are sensitive to gender differences. A "one-size-fits-all" approach may not be sufficient to address the knowledge gaps effectively across all student populations. Tertiary institutions have a crucial role to play in promoting student well-being beyond academics. Integrating comprehensive nutrition education, particularly on ultra-processed foods, into their health and wellness programmes is vital. High knowledge is a prerequisite for behaviour change. While this study confirms knowledge, it sets the stage for future research to investigate the translation of this knowledge into actual dietary practices among students. The findings open avenues for further research, including qualitative studies to understand the underlying reasons for gender differences in knowledge, and intervention studies to evaluate the effectiveness of targeted educational programmes.

Strengths of this study include using both male and female tertiary students as participants. Our findings can be used to initiate an intervention programme for healthy eating among students in all educational institutions. The limitations include that the study is cross-sectional, which cannot establish cause-and-effect relationships or track changes in knowledge over time. While "knowledge of health risks and dietary control practices" were assessed, the specific depth and breadth of this knowledge are not fully detailed. For example, it does not specify if students understood the long-term health consequences or the specific mechanisms by which ultra-processed foods impact health. Also, the study only considered gender and year of study as demographic variables. Other factors such as socio-economic status, field of study, prior nutrition education, or living arrangements (e.g., living at home vs. in a dormitory) could also influence knowledge and were not explored. While focused on tertiary institution students, the generalizability of these findings to all tertiary students in the region or beyond may be limited, depending on the specific characteristics of the surveyed institutions and students.

Conclusion

The study revealed that tertiary students possess a high level of knowledge regarding the health risks of ultra-processed food consumption and adopt good dietary control practices. This knowledge is significantly influenced by gender, with female students consistently demonstrating higher knowledge than their male counterparts in both areas. While final-year students generally exhibit higher knowledge compared to other year groups, the year of study is not an important factor considered in the knowledge of health risks or dietary control practices related to ultra-processed food consumption. These findings suggest that while there is a strong baseline of knowledge among students, gender is a crucial demographic factor influencing this understanding. Given the significantly lower knowledge levels among male students regarding both the health risks and dietary control practices related to ultra-processed foods, specific educational campaigns and awareness programmes should be

designed to target this demographic. These interventions could utilize communication channels and content formats that resonate more effectively with male students. However, the study underscores the need for targeted nutrition education and the promotion of healthy eating environments within tertiary institutions. These findings can inform policies and intervention programmes aimed at reducing UPF consumption and improving dietary habits among tertiary students in Nigeria.

While final-year students showed slightly higher knowledge, the lack of a significant association with the year of study suggests that consistent reinforcement of information on ultra-processed foods is needed throughout a student's academic journey. Integrating this topic into various curricula, not just health-related courses, could be beneficial. Recognizing the higher knowledge among female students, programmes could be developed to train and empower them as peer educators or advocates within their institutions. This could be an effective way to disseminate information and encourage healthier food choices among their peers, including male students. Practical workshops or initiatives that teach students how to identify ultra-processed foods, interpret food labels, and prepare healthier alternatives should be included in the curriculum. Universities should consider implementing policies that promote the availability of healthier food options and limit the accessibility of ultra-processed foods on campus. This could complement the students' knowledge with environmental support for healthier choices.

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