ASSESSMENT OF THE KNOWLEDGE, ATTITUDE AND CONSUMPTION PATTERN OF ANTIOXIDANT RICH FOODS AMONG CLINICAL STUDENTS OF EBONYI STATE UNIVERSITY,ABAKALIKI, NIGERIA.

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Abstract.

Background: Antioxidants are substances that help neutralize free radicals in the body. The free radicals are unstable molecules that can damage cells and contribute to aging and a wide range of diseases. Factors such as fast-food consumption, alcohol abuse, exposure to environmental pollutants, and chronic high-tech-related stress have all contributed to a rise in various health conditions. Antioxidants play a crucial role in protecting the body from these harmful influences by reducing oxidative stress and supporting overall well-being.

We aimed in this study to evaluate knowledge attitude and pattern of antioxidants rich foods consumption among clinical students in Ebonyi state.

Methodology: This is a descriptive cross-sectional study that was conducted among clinical students of Ebonyi state University in Abakaliki southeast Nigeria. Three hundred and five respondents were recruited using a stratified random sampling. Data was collected using a semi-structured self-administered paper-based questionnaire. Data analysis was done using the Statistical Package for Service Solutions (SPSS) software, version 25. Levels of statistical significance was set at $p < 0.05$.

Results: Majority of the respondents (73.4%) have good knowledge of antioxidants and largely strongly agreed that they believed that antioxidant-rich foods are important for maintaining good health (79.7%); 99.7% of the respondents have positive attitude towards Anti-oxidants and Anti-oxidants rich foods**.** A high proportion of female

clinical medical students (82.4%) had good knowledge of anti-oxidants and anti-oxidants rich foods when compared to male clinical medical students (65.6%). The difference in proportion was found to be significant ($\chi2$= 10.916; p=0.001)

Conclusion: This study findings revealed varying levels of awareness and knowledge about antioxidants, with notable gaps in both understanding and actual dietary practices. Overall, the results highlighted the need for targeted nutrition education, integrated into medical training, to promote healthier eating habits and encourage the preventive use of antioxidants in daily life.

KEY WORDS: Knowledge, attitude, consumption, antioxidant, clinical students.

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INTRODUCTION

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Antioxidants also referred to as free radical scavengers is any substance that delays, prevents or removes oxidative damage to a large molecule. Oxidative reactions produce free radicals that can start multiplying in reactions that eventually cause damage or death to the cell.[1] They can also prevent or slow down damage to cells caused by free radicals and unstable molecules that the body produces due to reaction to environmental and other pressures.[1] They are according to phytochemicals produced by plants to fight against viruses, fungi and bacteria.[2]

Food is any substance that provides nutritional support for the body[5] which is very vital for survival it can provide the following such as Energy, which supplies the calories needed for daily activities, bodily functions, and physical exertion.

Nutrients are the substances found in food that the body needs to function properly they are grouped into macronutrients and micronutrients..[5]

Non-communicable diseases such as diabetes, musculoskeletal disorders, cardiovascular diseases, neurological disorders, and cancers increase with age and place a burden on individuals and healthcare systems.[6] The global burden of non-communicable diseases has been rising over the last century, with the leading causes of disability being depression, diabetes, cardiovascular diseases and certain cancers.[7] World Health Organization also reported that about 3.2 million deaths each year are attributed to unhealthy feeding.[8]

Economic development and industrialization have led to changes in dietary habit in most of the world population especially in Nigeria. These changes have contributed to an increase in body mass in all groups leading to a global crisis with significant consequences.[9] Consumption of processed foods has also increased rapidly in Nigeria replacing use of natural, traditional, indigenous, cultural acceptable freshly cooked food.[10] This has been pointed out as a risk factor for increasing obesity as measured by Body Mass Index *(* BM1) among middle aged adults[11] *w*ith greater intake of processed foods, meat, oil and vegetable fat as well as a low consumption of fruit, vegetables and cereals.[12] Incorporating a diet rich in antioxidants can not only improve physical health but also support cognitive function and mental well-being. For medical students, who rely heavily on mental performance, consuming foods that support brain health (e.g., those rich in omega-3 fatty acids and antioxidants) can improve memory, focus, and resilience against the mental fatigue often experienced in demanding academic settings.[13] Understanding how clinical students perceive and incorporate antioxidant-rich foods into their diets is important in addressing the challenges they face in their academic and professional lives. Given the unique stressors that clinical students experience, promoting awareness about the health benefits of antioxidants, and encouraging their inclusion in daily nutrition, can be an effective strategy in reducing oxidative stress, improving health outcomes, and enhancing academic performance.[14]

JUSTIFICATION OF THE STUDY.

The study will give insight on the consumption pattern of antioxidants rich foods among clinical students. This will provide data for nutritionist, public health workers, policy makers and advocacies of food and nutrition. The study will also provide information which could be useful by the government in planning and executing programs of the wellbeing of the student. While the health benefits of antioxidants are widely recognized globally, there is limited data on the knowledge, attitude, and practices surrounding antioxidant consumption in Ebonyi State.[14] Factors which include cultural food preferences, socioeconomic status and access to nutritious foods may influence how we approach healthy eating including the consumption of antioxidant-rich foods. Promoting antioxidant-rich diets among medical students could lead to improved mental resilience, better academic performance and long-term health benefits.[15] Health educators and policymakers can tailor their messages to overcome these barriers by understanding attitudes and barriers regarding antioxidant-rich foods in different population groups.[16] This study has the potential to improve both personal and professional outcomes for a key segment of the population and will fill a critical gap

in understanding the dietary behaviors and health beliefs in the Nigerian population, which can be used to inform more effective public health initiatives.

1.4 OBJECTIVES OF THE STUDY

The main objective of the study is to access the Knowledge, attitude and practice of the consumption pattern of Antioxidant rich foods in Clinical students of Ebonyi state University, Abakaliki, Nigeria.

The specific objectives are to:

1. Assess the knowledge of antioxidant rich foods in Clinical students of Ebonyi state University, Abakaliki, Nigeria.
2. Ascertain the attitude of antioxidants rich food consumption among clinical students of Ebonyi state University, Abakaliki, Nigeria.
3. Assess the consumption pattern of antioxidant rich foods among clinical students of Ebonyi state University, Abakaliki, Nigeria

MATERIALS AND METHODS

Study Area

The study was conducted in Ebonyi State University which is located in Abakaliki, the capital city of Ebonyi State in southeastern region, Nigeria. Ebonyi State is one of the 36 States of the Federal Republic of Nigeria. It occupies a land mass of 6,400 square kilometers and lies between latitudes 6°15′ N and 6°45′ N and longitudes 7°30′ E and 8°30′ E.[17] It shares borders with Benue State to the north, Cross River State to the east, Abia State to the south, and Enugu State to the west. The inhabitants are mainly of Igbo ethnic nationality and are predominantly Christians.

Ebonyi State University (EBSU) has 10 faculties, including the College of Health Sciences, which houses the Department of Medicine and surgery. The College of Health Sciences is situated at the Presco Campus of EBSU in Abakaliki LGA. The university's medical students receive clinical training at Alex Ekwueme Federal University Teaching Hospital, which is also located in Abakaliki metropolis.

Study Design

A cross-sectional descriptive study was used to collect data.

Study Population.

The population included Clinical students of the Department of Medicine and Surgery of the University.

Inclusion criteria.

1. Medical students of Ebonyi State University, Abakaliki of 4th to 6th year classes.
2. Medical student who are willing, present during the interview and gives consent to participate in the study.

Exclusion criteria

1. Any student not part of the mentioned classes
2. Students that may be absent at the time of data collection

3.4 Sample Size Determination

The sample size was determined using the Cochran formular;

Formula: $n = \frac{Z^2 \times p \times (1-p)}{d^2}$

Where:

N = minimum sample size

Z = Z-score for 95% confidence level (1.96)

p = Estimated proportion of 75% based on a previous study in Nigeria[36], therefore P = 0.75)

D = margin of error (typically 5% or 0.05)

For a 95% confidence level:

- Z = 1.96
- p = 0.75
- d = 0.05
- q=0.25

So,

$$n = \frac{(1.96)^2 \times 0.75 \times (1-0.75)}{(0.05)^2} = \frac{3.8416 \times 0.75 \times 0.25}{0.0025}$$

$$n = \frac{0.7203}{0.0025} = 288.12$$

Rounding up, we get N ≈ 288

To compensate for non-response, r:

Desired sample size= minimum sample size/1-r

$$r = 10\% = \frac{10}{100} = 0.1$$

$$\text{Sample size (N)} = \frac{N}{1-r} = \frac{288}{1-0.1}$$

$$= \frac{288}{0.9} = 320 \text{ students}$$

3.5 SAMPLE TECHNIQUE

A stratified random sampling technique was used to select participants specifically from the fourth to sixth-year medical students of Ebonyi State University. The medical students were grouped into three strata based on their academic level and number in class. After the sample size was determined for each academic year, a simple random sampling method was used to select participants by proportionate allocation. Each student was assigned a unique identifier, and a random number generator was employed to select the required number of participants per stratum. This approach ensured each student had an equal chance of selection within their respective year, thereby reducing selection bias.

Data Collection Tool

A semi-structured self-administered paper-based questionnaire was used to collect information for this study based on previous studies on antioxidant rich food consumption in clinical students[2] and refined to align with the objectives of this study. The questionnaire consists of 4 sections; Section A: Demographic characteristics; This was used to collect personal information which included the respondent's name, age, sex, tribe, religion, marital status and monthly allowance; Section B: Knowledge of antioxidants rich foods including various types; Section C: Attitudes toward antioxidants rich foods which includes importance, educational and personal beliefs about antioxidants and Section D: Antioxidant practices which includes how often one consumes antioxidants foods.

METHOD OF DATA COLLECTION

Data was collected using a paper-based questionnaire administered to the participants Prior to assessing the questionnaire, participants were required to review and sign a consent form attached to the questionnaire. This form outlined the purpose of the study, voluntary nature of participation and assurances of anonymity and confidentiality. Prior to distribution, the questionnaire was carefully reviewed to ensure clarity and comprehensiveness. This approach allowed for efficient data collection while ensuring the anonymity and confidentiality of responses. The data collection and editing was done manually to detect omissions and ensure uniform coding.

DATA ANALYSIS

Data analysis was done using the Statistical Package for Service Solutions (SPSS) software, version 27. Categorical variables were summarized using frequencies and proportions while continuous variables were summarized using mean and standard deviation. Test of statistical association was done with chi square test for categorical variables. Levels of statistical significance was set at $p < 0.05$.

MEASUREMENT OF VARIABLES.

The independent variables include the socio-demographic characteristics. The outcome variables are knowledge of antioxidant rich foods, attitude towards consumption of antioxidant rich foods and practices of consumption of antioxidant rich foods. The respondents' Knowledge was assessed in Section B of the questionnaire by constructing a composite scores of one (1) for every correct answer and a score of zero (0) for every incorrect answer. The possible total score when summed up was 34 and scores below 17 is said to have poor knowledge and scores above 17 is said to have good knowledge. Attitude was assessed in Section C of the questionnaire. Responses from the Likert scale was assigned a score of five (5) for strongly agree, four (4) for agree, three (3)for neutral, two (2) for disagree and one (1) for strongly disagree answers. The practice variables were assessed by chi square.

3.9. ETHICAL CONSIDERATIONS

An ethical approval for the study was obtained from the ethical research committee of Ebonyi State University and the Ethics Research Committee of the Alex Ekwueme Federal University Teaching Hospital. Advocacy visit was

carried out to the class representative who gave his permission to access the students. All respondents were informed about the purpose of the research and appropriate steps were taken to address the ethical issues which were encountered in the course of this study. They included the following:

Confidentiality: The questionnaire did not include self-identifying characteristics such as participant's name, phone numbers and address.

Informed consent: Participants were informed of the purpose of the study and their roles and rights as participants. Their consent to participate were sought and documented using an informed consent form.

Voluntary Participation: Participation was voluntary and respondents was informed that they could withdraw from the study at any stage if they wished, without any consequence to them.

Beneficence to participants: Respondents were informed that the outcome of this study will be of great benefits to them.

Non-maleficence to participants: Respondents were informed that there would be no risks to them with regards to their participation in this survey.

RESULTS

Table 1A: Socio-demographic characteristics of the respondents

Variable	Frequency (N=305)	Percentage (%)
Age of respondents in years		
Mean ± SD	23.91 ± 2.342	
Age of respondents in groups		
<21 years	16	5.2
21-23 years	121	39.7
24-26 years	141	46.2
>26 years	27	8.9
Gender		
Male	163	53.4
Female	142	46.6
Marital status		
Single	290	95.1
Married	13	4.3
Divorced	2	7
Year of study		
4th year	107	35.1
5th year	143	46.9
6th year	55	18
Religion		
Christianity	302	99.0
Islam	2	7
Atheist	1	3
Living arrangement		
On campus	49	16.1
Off campus with parents and family	47	15.4
Off campus with roommates and friends	46	15.1
Off campus alone	163	53.4
Medical illness*		
Heart problem	15	4.9
Eye problem	63	20.7
Peptic gastritis	36	11.8
Fibroid	2	7
Diabetes	1	3

Brain related problem	3	1.0
Arthritis	3	1.0

*Multiple answers allowed

Table 1A shows Socio-demographic characteristics of the respondents. The mean age of the respondents was 23.91 ± 89.512 years. A high proportion of the respondents were aged 24-26years (46.2%). Majority of the respondents were male (53.4%), single (95.1%), Christian (99%), and live off campus alone (53.4%)

Table 2: Awareness about Anti-oxidants

Variable	Frequency (N=305)	Percentage (%)
Have you heard of Antioxidant		
Yes	291	95.4
No	14	4.6
Source of information*		
Medical school lectures	275	90
Television	17	5.6
Radio	6	2
Friends or peers	13	4.3
Social media/internet	43	41
Family members	16	5.2
Newspaper	8	2.6
Journals	10	3.3
Workshop seminars	3	1

*Multiple answers allowed

Table 2 shows that 95.4% have heard about antioxidants before. The most common source of information were medical school lectures (90%), and social media/internet (41%)

Table 3A: Knowledge of Antioxidants

Variables	Frequency (N=305)	Percentage (%)
What are antioxidants		
Compounds that help protect cells from damage by free radicals	288	94.4
Vitamins and minerals	9	3
I am not sure	8	2.6
Examples of antioxidant rich foods*		
Berries	186	61
Rice	18	5.9
Nuts seeds	116	38
Red meat	13	4.3
Plantain	24	7.9
Dark chocolate	45	14.8
Fish	68	22.3
Processed snacks	25	8.2
Leafy greens	92	30.2
Whole grains	75	24.6
Bread	23	7.5
Sardines	23	7.5

Importance of antioxidant rich foods *

Reduced risk of chronic disease	213	69.8
Prevent the ageing of the skin	199	65.2
Help improve immune function	215	70.5
I am not sure	13	4.3

Antioxidant awareness*

Vitamin C	213	69.8
Vitamin E	222	72.8
Beta Carotene	99	32.5
Selenium	80	26.2
Polyphenols	13	4.3
Flavonoids	23	7.5
I don't know any	29	9.5

Vitamins in Foods containing antioxidant properties*

Vitamin C	201	65.9
Vitamin A	132	43.3
Vitamin K	34	11.1
Vitamin E	209	68.5
Vitamin D	26	8.5
I am not sure	16	5.2

*Multiple answers allowed

Table 3A shows that majority of the respondents (94.4%) responded that Antioxidants were compounds that help protect cells from damage by free radicals. A high proportion of the respondents responded that leafy green was an example of anti-oxidants (30.2%) and improved immune function is an importance of anti-oxidant rich foods (70.5%).Most of the respondents knew that Vitamin E (72.8%) and Vitamin C (69.8%) contains antioxidants.

Table 3B: Knowledge of Antioxidants

Variables	Frequency (N=305)	Percentage (%)
A diet containing plenty of fruits and vegetables, whole grains and nuts can supply all the antioxidants your body needs		
True	213	69.8
False	32	10.5
Not sure	60	19.7
Vitamin A gives fruits and vegetables rich colour which is present in the yellowish and reddish fruits and deep green vegetable?		
True	211	69.2
False	20	6.6
Not sure	74	24.3
Vitamin C specifically is a powerful antioxidant that can help to reduce the effects of oxidative damage caused by pollution, stress or poor diet?		
True	241	79

False	17	5.6
Not sure	46	15.1

Unhealthy substances called bio-oxidants could result to disease if accumulated in the body

True	276	90.5
False	10	3.3
Not sure	19	6.2

Are you aware of the relationship between oxidative stress and diseases such as heart disease, diabetes and cancer

Yes	243	79.7
No	30	9.8
Not sure	31	10.2

Level of Knowledge

Good Knowledge	224	73.4
Poor Knowledge	81	26.6

Table 3B shows that majority of the respondents affirmed that unhealthy substances called bio-oxidants could result to disease if accumulated in the body (90.5%) and that they were aware of the relationship between oxidative stress and diseases such as heart disease, diabetes and cancer. Majority of the respondents (73.4%) have good knowledge of antioxidants.

Table 4: Attitude towards Antioxidants and Antioxidant-Rich Foods

Variables	Attitude (N=305)				
	SA N (%)	A N (%)	N N (%)	D N (%)	SD N (%)
I believe that antioxidant-rich foods are important for maintaining good health	243 (79.7%)	59 (19.3%)	3 (1%)	0 (0%)	0 (0%)
I try to include foods that are high in antioxidants in my diet	124 (40.7%)	108 (35.4%)	66 (21.6%)	7 (2.3%)	0 (0%)
I believe that antioxidant-rich foods are better than antioxidant supplements?	149 (48.9%)	89 (29.2%)	54 (17.7%)	9 (3%)	4 (1.3%)
I have no interest in learning about the health benefits of antioxidants	26 (8.5%)	22 (7.2%)	28 (9.2%)	118 (38.7%)	111 (36.4%)
How strongly do you agree with the statement: "Eating antioxidant-rich foods is a habit I would encourage my friends and family to adopt.	155 (50.8%)	99 (32.5%)	40 (13.1%)	7 (2.3%)	4 (1.3%)
Do you think medical professionals should emphasize the importance of antioxidant-rich foods as part of a healthy lifestyle.	173 (56.7%)	104 (34.1%)	23 (7.5%)	2 (0.7%)	3 (1%)
Antioxidant-rich foods are cheaper compared to over processed or fast foods.	103 (33.8%)	67 (22%)	104 (34.1%)	25 (8.2%)	6 (2%)

I feel the awareness about antioxidant is low	127 (41.6%)	115 (37.7%)	52 (17%)	7 (2.3%)	4 (1.3%)
I would recommend consuming antioxidant-rich foods to my peers.	147 (48.2%)	114 (37.4%)	39 (12.8%)	4 (1.3%)	1 (0.3%)

SA=strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree

Majority of the respondents strongly agreed that they believed that antioxidant-rich foods are important for maintaining good health (79.7%), eating antioxidant-rich foods is a habit they would encourage their friends and family to adopt (50.8%), and that they think medical professionals should emphasize the importance of antioxidant-rich foods as part of a healthy lifestyle (56.7%), Table 4.
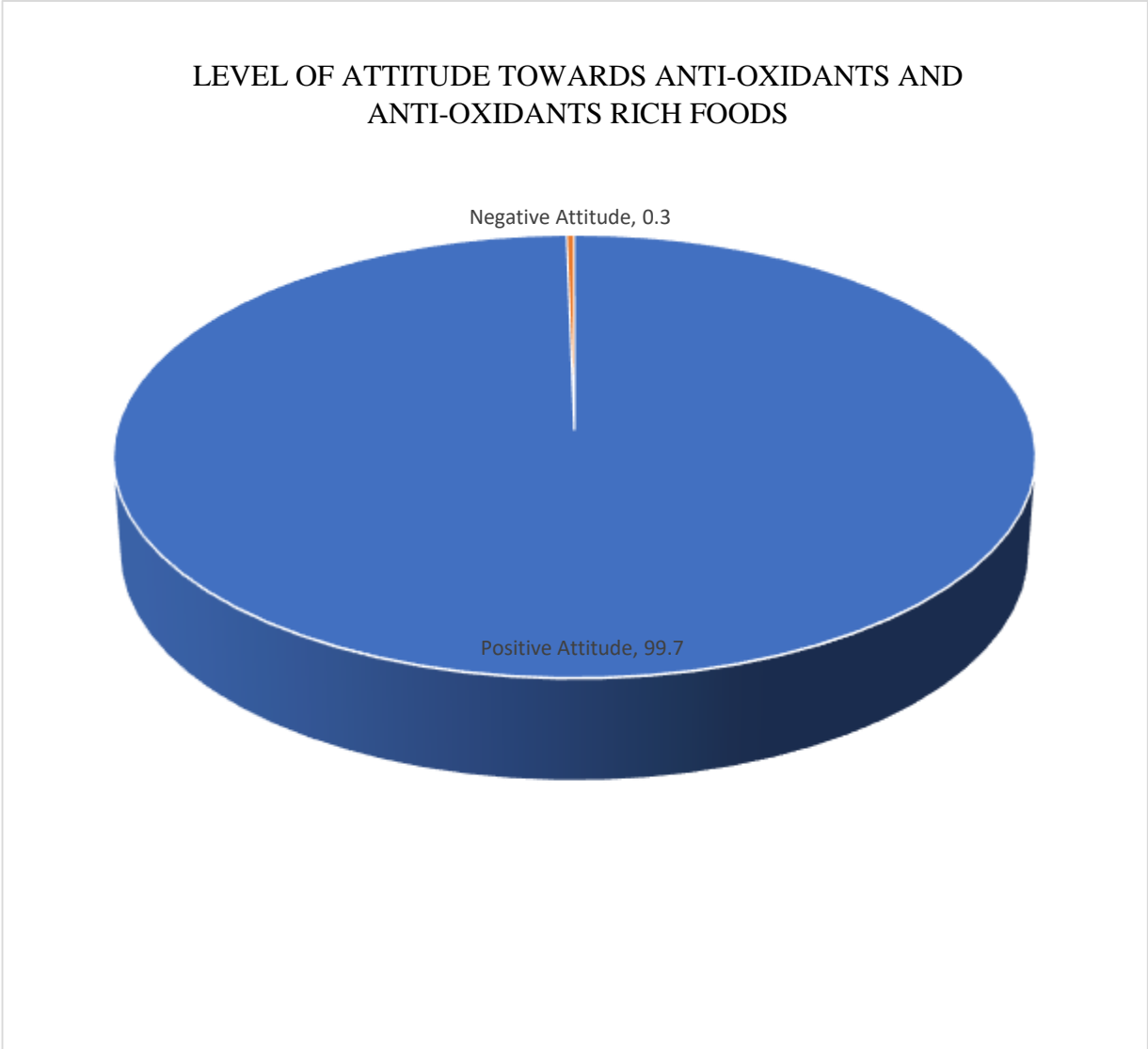

LEVEL OF ATTITUDE TOWARDS ANTI-OXIDANTS AND ANTI-OXIDANTS RICH FOODS

Negative Attitude, 0.3

Positive Attitude, 99.7

Fig 1: Level of Attitude towards Anti-oxidants and Anti-oxidants rich foods

The pie chart shows that the level of positive attitude towards Anti-oxidants and Anti-oxidants rich food was 99.7%, fig 1.

Table 5: Consumption Patterns of Antioxidant-rich foods among Clinical medical students in Ebonyi state university.

Variable	Frequency (N=305)	Percentage (%)
How often do you consume these fruits		
Daily	25	8.2
3 times a week	190	62.5
Once a week	5	1.6
Rarely	84	27.5
Never	1	3
How often do you consume processed foods		
Daily	73	23.9
3 times a week	161	52.8
Once a week	4	1.3
Rarely	65	21.3
Never	2	7
Which of the following antioxidant rich foods do you consume regularly*		
Fruits	186	62
Vegetables	156	50.5
Nuts and seeds	75	24.6
Whole grains	91	29.8
Green tea	32	10.5
Dark chocolate	29	9.5
Supplements	38	12.5
I do not consume these regularly	33	10.8
Do you prefer to consume antioxidants through foods or supplements?		
Food	215	70.5
Supplement	11	3.6
Both	73	23.9
Neither	6	2.0

*Multiple answers allowed

Majority of the respondents, Table 5, consume fruits three times a week (62.5%), while 52.8% consume processed foods.

Table 6: Barriers to consumption of Anti-oxidant rich foods

Variable	Frequency (N=305)	Percentage (%)
What barriers prevent you from consuming more antioxidant rich foods?		
High cost of antioxidant rich foods	201	65.9
Limited availability of fresh products	47	15.4
Lack of knowledge or information	14	4.6
I do not consider any foods as antioxidant rich	13	4.3
Personal preferences (taste, etc)	25	8.2
Lack of cooking skills	5	1.6

Do you feel that being a medical student affect your eating habit or ability to consume nutritious foods		
Yes, it's challenging to eat well due to time and stress	211	69.2
No, I manage to eat nutritious foods despite being a student	38	12.5
Sometimes, but I try to patronize my health	56	18.4

Table 6 shows that most common barrier among the respondents was high cost of anti-oxidants rich foods (65.9%). Sixty nine point two (69.2%) of the respondents responded that it was challenging to eat well due to time and stress.

Table 7: Association Between the Socio-demographic characteristics and Knowledge of antioxidant rich foods among Clinical medical students in Ebonyi state university

Variables	Knowledge (N=305)		χ^2	p value
	Good (%)	Poor (%)		
Age of respondents in group				
<21 years	12 (75%)	4 (25%)	1.160	0.763
21-23 years	92 (76%)	29 (24%)		
24-26 years	102 (72.3%)	39 (27.7%)		
>26 years	18 (66.7%)	9 (33.3%)		
Gender				
Male	107 (65.6%)	56 (34.4%)	10.916	0.001*
Female	117 (82.4%)	25 (17.6%)		
Marital Status				
Single	215 (74.1%)	75 (25.9%)	5.721	0.057
Married	9 (69.2%)	4 (30.8%)		
Divorced	0 (0%)	2 (100%)		
Year of study				
4th year	76 (71%)	31 (29%)	0.494	0.781
5th year	107 (74.8%)	36 (25.2%)		
6th year	41 (74.5%)	14 (25.5%)		
Religion				
Christianity	222 (73.5%)	80 (26.5%)	0.926	0.629
Islam	1 (50%)	1 (50%)		
Others	1 (100%)	0 (0%)		
Living arrangements				
On-campus	42 (85.7%)	7 (14.3%)	5.504	0.138
Off campus with parents and family	31 (66%)	16 (34%)		
Off campus with roommates and friends	32 (69.6%)	14 (30.4%)		
Off-campus alone	119 (73%)	44 (27%)		

*Significant at p value < 0.05

Table 7 shows that only gender was statistically significant to knowledge of antioxidant rich foods among clinical medical students in Ebonyi state university. A high proportion of female clinical medical students (82.4%) had good knowledge of anti-oxidants and anti-oxidants rich foods when compared to male clinical medical students (65.6%). The difference in proportion was found to be significant ($\chi2$= 10.916; p=0.001)

DISCUSSION

The high level of awareness of anti-oxidant rich foods among the respondents corroborates with findings from similar studies among undergraduates at Michael Okpara University of Agriculture, Umudike South East Region Nigeria[17], where it was reported that the mean age was 24 years, that majority (69.9%) of the students were females, majority (82.5%) were single more than half (69.7%) were dependent on someone. The result showed that the majority (86.9%) of the students had good knowledge of antioxidant rich foods. The result showed that 86.9% students also had good attitude towards antioxidant rich foods.

The most common source of information about anti-oxidants for our study were medical school lectures (90%) could be because of their active participation during lectures, and social media/internet (41%) perhaps due to the prevailing addiction of students to internet use whereas the low percentage of respondents on use of Television, radios, newspapers and journals might be as a result of lack of public interest in them.

Gender which was statistically associated with good knowledge of antioxidants rich food corroborates research done among university students in Ado-Ekiti ,south west Nigeria indicating that female students often have better nutritional knowledge and healthier eating practices than their male counterparts. Also, among University of Poland science student research was conducted and they recorded that the nutritional knowledge for women was 34.7% satisfactory and 34.7% good. In contrast, nutritional knowledge for men varied, amounting to 40.2% satisfactory and 25.1% good. Majority of the respondents (73.4%) have good knowledge of antioxidants and they affirmed that unhealthy substances called bio-oxidants could result to disease if accumulated in the body (90.5%) and that they were aware of the relationship between oxidative stress and diseases such as heart disease, diabetes and cancer.[18]

The high positive attitude towards Anti-oxidants and Anti-oxidants rich foods, readiness to share with friends and family to adopt eating habits could be due to their knowledge of the benefits of them. This positive attitude is consistent with studies highlighting that while knowledge about healthy dietary habits is common, the actual practice may be suboptimal[19]

This pattern of consumption suggests that while fruits are a common source of antioxidants, daily consumption is not universal which may be linked to the demanding schedules of clinical medical students, which potentially limits their access to fresh fruits. In addition, economic factors and market availability may influence students' dietary choices, with antioxidant-rich fruits possibly being viewed as less cost-effective compared to staple meals.

High cost and limited availability findings are corroborated by studies from other Nigerian universities[20,21], where factors such as cost and availability significantly influenced dietary habits

A study carried out in Canada7[6] reported increases in serum antioxidant capacity with consumption of strawberries, spinach red wine or vitamin C in elder women. Also, in elderly women beneficial effects of antioxidants are evident. In a study carried out in Igbi-Etiti, Enugu State, south east region, Nigeria[22], the researchers found that Fruit and vegetable intakes showed that 28.1% and 11.3% respondents took them twice daily while 23.3% ate grains, legumes and nuts twice daily. For the three food groups, 7.3% and 2.3% never consumed them. There were positive associations between knowledge of antioxidant rich foods and consumption from various sources by the adults which furthershowed that good knowledge of dietary sources of antioxidant improves intakes while reverse could be true when knowledge is poor.

Further study in Italy[23] in a bid to better characterize the phytochemical and **antioxidant** profiles of the fruit of nine different genotypes of strawberry. showed the important role played by the genetic background on the chemical and antioxidant profiles of strawberry fruits. Significant differences were found between genotypes for the total antioxidant capacity and for all tested classes of compounds. The high-performance liquid chromatography (HPLC) analyses confirmed qualitative and quantitative variability in the antioxidant profiles. These studies show that differences exist among cultivars, applicable in dietary studies in human subject. They suggested that regular

consumption of antioxidant rich strawberries may exert an improvement on the plasma antioxidant status and an increase on the antihemolytic defenses of human erythrocytes.

CONCLUSION

Findings revealed varying levels of awareness and knowledge about antioxidants, with notable gaps in both understanding and actual dietary practices. While many students showed a positive attitude toward the health benefits of antioxidant-rich foods, this did not always translate into consistent consumption behavior.Sociodemographic factors such as age, year of study, and gender showed significant associations with levels of knowledge and consumption practices, suggesting that educational exposure and personal habits may influence health-related choices. Overall, the results highlighted the need for targeted nutrition education, integrated into medical training, to promote healthier eating habits and encourage the preventive use of antioxidants in daily life.

RECOMMENDATION

1. Students should be encouraged to read credible health articles or attend nutrition workshops to build personal knowledge.

2. Improve their attitude and increase their consumption of antioxidant natural sources like fruits (e.g., berries), vegetables (e.g., spinach, kale), nuts, and green tea in their diet and reduce intake of processed foods and sugary snacks

3. The students should develop good study habits and time management techniques to reduce academic pressure and avoid last-minute stress before examinations.

4. Parental financial and material support: are important to increase affordability of these foods

5. The University should organize school-wide sensitization like "Healthy Food Week" with talks, cooking demonstrations, and competitions.

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