



Research

Dietary diversity and nutritional status of undergraduate students in Public Tertiary Institutions in Oyo State, Nigeria

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Abstract

Dietary diversity is the number of different foods or food groups consumed over a given reference period and also it is qualitative measure of food consumption that reflects household and individual to a variety of food. Lack of dietary diversity and poor nutritional status is a problem among university students which have negative consequences on an individual health, well-being and development. Diversified diet is essential for the success of adequate nutrient for optimal health, mental well-being, satisfaction and enjoyment. A cross-sectional study was carried out to assess dietary diversity and nutritional status among 200 undergraduate students aged 16-24 years in two Public tertiary institutions in Oyo state. A semi structured self-administered questionnaire was used to gather information on socio-demographic and socio-economic variables, Anthropometric measurement, Dietary diversity and 24-hour dietary recall of the respondents. Data were analyzed using statistical package for social sciences (SPSS) software program, version 20.0, descriptive statistics such as frequency, mean, standard deviation and correlation was carried out at $P < 0.05$. The level of underweight was 11.0%, normal weight 74.0%, overweight 12.5% while obesity was 2.5%. Majority (85.0%) of the respondents had medium dietary diversity and no significant relationship between dietary diversity and nutritional status of the respondents. There was statistical difference between the fat intakes of the respondents by gender, strong association between body mass index and the reason against the respondents eating certain foods (0.00%) and also between body mass index and mother's occupation (0.00%). In conclusion, dietary diversity should be encouraged most especially the intake of fruits and vegetables among undergraduates.

Keywords: Dietary Diversity, Nutritional Status, Public Tertiary Institutions, Undergraduate Students

Background of the study

A mixture of food is needed to meet supplies of individuals for important nutrients, and the rate of diversity in diets has long been recognized (Hoshmand and Udipi, 2013). The scientific community has placed a lot of emphasis on the importance of adequate diet, putting down dietary guidelines to guarantee adequate nutrient intake by individuals. In some developing countries, dietary diversity is given greater significance to address nutritional deficiencies because research has shown that low dietary diversity has harmful effects on health, immunity, mental health, reproductive as well as social capabilities (Nithya and Bhavani, 2017).

Dietary diversity is corresponding with nutrient density and diet adequacy of people, and it is a pointer to which the diet provides adequate energy, protein, and essential micronutrients (Nithya and Bhavani, 2018). Dietary diversity is considered as a measure of access to food at individual, household, community and national level. It shows dietary quality, the key point being the adequacy of micronutrient in the diet (Vakili *et al*, 2013).

The nutritional status of adolescents, most especially girls are important as girls will be future mothers and their wellbeing will contribute to future generations (Nithya and Bhavani, 2018). Poor nutrition among adolescents resulting in underweight and a low lean body mass is linked with many co-existing and future adverse health outcomes, including poor reproductive output among women (Mandela, 2018). Most University students do not meet the recommended dietary allowance of most of the macronutrient and micronutrient. College students tend to practice inadequate physical activity and poor eating habits, for

instance skipping meals, little intake of vegetable, fruits and fish and prefer to consume fatty foods and poor physical activity (Hakim *et al.*, 2012). Therefore, the study was carried out to assess dietary diversity and nutritional status among undergraduate students in public tertiary institutions (University of Ibadan and Polytechnic of Ibadan) in Oyo State so that nutrition involvement can be planned to improve their nutritional status.

Materials and methods

A descriptive cross-sectional survey was carried out to assess the dietary diversity and nutritional status of undergraduate students in public tertiary institutions in Oyo State. Undergraduate students, male and female aged 16-24 years old in the selected public tertiary institutions in Oyo State selected for the study.

Sample size determination

The minimum sample size was calculated using the sample size formula for the single proportion (Scott Smith, 2013).

$$n = \frac{Z^2(p)(q)}{d^2}$$

Where Z is the Z score value at 95% confidence interval = 1.96

n= Minimum sample size

d is the precision (0.05)

p = 37% (Prevalence of malnutrition in Nigeria) (NNHS, 2018)

q= 1-p

$$n = \frac{1.96^2(0.37)(0.63)}{(0.05)^2}$$

The total sample size for this study = 200

Method of data collection

Multistage random sampling technique was used in selecting representative respondents from two Public tertiary institutions in Oyo state followed by random selection of six faculties from the two selected institutions then selection of two departments from each selected faculty and selection of students from each selected departments.

Semi-structured self-administered questionnaire was used to collect information on the socio-demographic variables and dietary diversity of the respondents. Anthropometric Measurement such as weight of the respondents was taken using Digital Weighting Scale and height was measured using a Height Meter. This was used to calculate their Body Mass Index used in assessing the nutritional status of the respondents. Dietary diversity score was used to assess the level of dietary diversity of the respondents. A 24-hours dietary recall questionnaire was used to gather information on the specific food intakes and usual portion sizes after due informed consent approval. Data were analyzed using statistical package for social sciences (SPSS) software program, version 20.0. Descriptive statistics such as frequency, mean, standard deviation and correlation was carried out at 5% significance to assess the relationship between Dietary diversity and nutritional status.

Ethical clearance

An approval was obtained from Babcock University Health Research Ethics Committee (BUHREC). Informed consent was obtained from the various Heads of Departments and also from the students before the study was carried out.

Data analysis

Data were analyzed using statistical package for social sciences (SPSS) software program version 20.0. The information on usual portion sizes that were reported on the 24- hours dietary recall questionnaire was converted into weight of food in grams and analyzed for adequacy in nutrient intake using the Adapted Total Dietary Assessment (TDA 1.0.4) software. Dietary diversity score was used to determine the dietary diversity. Descriptive statistics such as frequency, mean and standard deviation, and correlation was carried out at 5% level of significance to assess the relationship between dietary diversity and nutritional status.

Results

Table 1 shows the socio-demographic characteristics of the respondents. There were more females (58.5%) than males (41.5%). More than average Majority (52.5%) were between the age 20 and 22 years, 33.0% were between 17 - 19 and 14.5% were between 23 – 24 years. 81.5% were Christians, 17.5% were Muslim, 5.0% were Traditionalist while 5.0% were Others (which included Atheism). Also, 62.5% were on Campus while 37.5% were Off-campus. Monthly allowance of the respondents were between <₦10,000 and >₦40,000 , 31.0% received less than ₦10,000, 46.5% were within the range of ₦10,000- ₦20,000, 15.0% within the range of ₦20,000- ₦30,000, 4.5% had between 30,000-40,000, and 3.0% received more than ₦40,000/month. 50% of the respondents' fathers were Civil servant while 53.5% of the respondents' mothers are Self-employed.

Table 2 shows the nutritional status of the respondents using Body Mass Index (BMI). Majority of the respondents (74.0%) had normal BMI, 11.0% were underweight, 12.5% were overweight and 2.5% were obese. In Table 3, the dietary diversity score of the respondents were 10.0% for low dietary diversity, 85.0% had medium, while 5.0% had high dietary diversity.

This shows that most of the respondents have medium dietary diversity.

Table 4 shows the nutrient intake of the respondents by gender. There was no significant difference in the nutrient intake of the respondents by gender except in fat intake. Majority of the respondents' nutrient intake were below the RDAs. The Chi-square value is 0.05 which indicates that there is significance in the Fat intake of both respondents.

Table 5 shows the dietary habits of the respondents. More than half of the respondents (56.0%) eat twice a day. More than half of the respondents (52.5%) ate moderately, 55.5% spent 10-20 minutes to finish a meal, 52.0% chose breakfast if they were to skip a meal, while 75.5% chose time as the reason for skipping meal. Other reasons were Money (10.0%), Appetite (5.5%), Fasting (1.5%), Laziness (4.5%); and 5.0% of the respondents did not have any reason for skipping meals. Majority (67.5%) of the respondents frequently visited the cafeteria to eat. Less than half 39.0% of the respondents often eat out 1-2 times in a week, 18.0% ate out every day, 21.0% ate out 3-4 times in a week, 13.0% ate 5-6 times in a week while 9.0% didn't eat out. The respondents that had snacks anytime was 41.5%, 30.0% usually had snacks between lunch and supper, 27.5% usually had snacks between breakfast and lunch while 1.0% usually had snacks after supper. Majority (59.5%) of the respondents usually snack while watching television and 40.5% doesn't usually snack while watching television. The kind of food the respondents never ate: Beans (8.0%), Draw soup which includes Okro, *Ogbono* and *Ewedu* (6.0%), Cereal (Rice, Pap, Custard and Oat) 11.0%, Pork (5.0%), Swallow (12.5) which includes *Eba*, Semolina, Pounded yam, *Amala* and Wheat, Yam/Potato (8.0%), Snail (8.5%), Egg (2.0%), Vegetable (3.0%) and Nil (36.0%) which includes the respondents that didn't have food to eat.

The reason against the respondents eating certain foods include: Bad taste (5.0%), Taboo (which includes Ethnic culture and Religion (2.5%)), Allergic to them (9.5%), Never liked them (26.5%), Disliked their smell, shape and texture (17.5%) and Other (39.0%) which includes respondents that does not have a reason against eating certain foods. Majority of the respondents' emotion affects the way they eat (64.5%) while 35.5% of the respondents eating habit didn't get affected by their emotion. In the result, 88.0% of the respondents have tried to exercise, Meanwhile, 32.0% of the respondents are afraid of getting overweight, 49.5% were not afraid of been overweight, 9.0% afraid of been overweight often, while 9.5% were rarely afraid of been overweight. Most of the respondents believe in the saying they are what they eat (79.5%). 69.5% ate outside the campus a day before the questionnaire was shared while 30.5% did not. The relationship between the nutritional status and dietary diversity of the respondents is as shown in Table 6. There was no significant difference between the nutritional status and the dietary diversity of the respondents.

Discussion

Most of the respondents skipped breakfast than other meals, and the reasons were time, money, fasting, laziness and appetite in line with the findings of Otuneye *et al.*, (2017), and more than half of the respondents complained about the time frame because they usually have classes in the early hours of the morning and would have to hurry to for their classes.

Some of the respondents stayed away from certain foods because of personal dislike, social and cultural pressure, and religion and so on. Some of these dietary patterns appear quite among undergraduates such as snacking, meal skipping, particularly breakfast or irregular meals, wide use of fast-food and also low consumption of fruits and vegetables (Omage and Omuemu, 2018). Other dietary habits

observed among the respondents are eating meal outside the home, infrequent intake of fruits and vegetables, and consumption of more snacks (Otuneye *et al.*, 2017). And majority of the respondents had medium dietary diversity score (consuming 4-5 food groups), followed by low dietary diversity score (consuming 0-3 food groups) then high dietary diversity score

(consuming 6-9 food groups). There was no significant difference between the dietary diversity of the respondents and the nutritional status of the respondents and this agrees with Nachvak *et al.*, (2017) that high dietary diversity score is associated with consumption of fruit and vegetable groups.

Table 1: Socio-Demographic Characteristics of the Respondents

Characteristics	Variables	Frequency (f)	Percentage (%)
Sex	Male	83	41.5
	Female	117	58.5
	Total	200	100
Age	17-19	66	33.0
	20-22	105	52.5
	23-24	29	14.5
	Total	200	100
Religion	Christianity	163	81.5
	Islam	35	17.5
	Traditional	1	0.5
	Others	1	0.5
	Total	200	100
Monthly Allowance	Below ₦10,000	62	31.0
	₦10,000- 20,000	93	46.5
	₦20,000- 30,000	30	15.0
	₦30,000- 40,000	9	4.5
	Above 40,000	6	3.0
	Total	200	100
Fathers Occupation	Civil Servant	100	50.0
	Unemployed	7	3.5
	Self Employed	93	46.5
	Total	200	100
Mothers Occupation	Civil Servant	83	41.5
	Unemployed	10	5.0
	Self Employed	107	53.5
	Total	200	100

Table 2: Nutritional Status of the Respondents

Characteristics	Variables	Frequency (f)	Percentage (%)
BMI	Underweight	22	11.0
	Normal	148	74.0
	Overweight	25	12.5

Obese	5	2.5
Total	200	100

Table 3: Dietary Diversity Score of the Respondents

	Frequency (f)	Percentage (%)
Low dietary diversity	20	10.0
Medium dietary diversity	170	85.0
High dietary diversity	10	5.0
Total	200	100.0

Table 4: Nutrient Intake of the Respondents by Gender

Nutrients	Males			Females			P-Value
	RDA	Mean±SD	% RDA	RDA	Mean±SD	% RDA	
Calorie (Kcal)	2900	1376.4±604.5	47.5	2200	1069.1±252.2	48.6	0.12
Protein (g)	58	27.5±5.0	47.4	46	25.2±10.4	54.8	0.68
Carbohydrate(g)	130	126.0±30.3	96.9	130	118.1±53.8	90.8	0.53
Fiber(g)	38	14.0±2.8	36.8	25	12.9±6.1	51.6	0.74
Fat(G)	35	25.8±38.2	73.7	35	13.1±7.1	37.4	0.05
Vitamin A(mcg)	900	130.3±39.6	14.5	700	105.0±79.1	15.0	0.55
Vitamin C(mg)	75	24.3±6.3	32.4	60	23.9±25.3	39.8	0.97
Vitamin B1 (mg)	1.2	1.0±0.0	83.3	1.1	1.0±0.7	90.9	1.00
Vitamin B ₂ (mg)	1.3	0.8±0.5	61.5	1.1	0.3±0.6	27.3	0.19
Vitamin B ₃ (mg)	16	8.5±2.4	53.1	14	8.0±4.2	57.1	0.83
Vitamin B ₆ (mg)	1.3	0.3±0.5	23.1	1.3	0.5±0.5	38.5	0.66
Folate (mcg)	400	229.3±116.5	57.3	400	275.5±130.5	68.9	0.53
Vitamin B ₁₂ (mcg)	2.4	0.0±0.0	0	2.4	0.2±0.4	8.3	0.37
Calcium (mg)	1000	180.5±69.5	18.1	1000	156.3±74.9	15.6	0.57
Phosphorus (mg)	700	386.8±113.8	55.3	700	358.1±156.7	51.2	0.74
Sodium(mg)	2300	990.5±670.2	43.0	2300	879.2±559.3	38.2	0.74
Potassium(mg)	4700	888.5±365.2	18.9	4700	904.7±420.2	19.2	0.94
Zinc(mg)	11	4.8±0.5	43.6	8	4.2±1.3	52.5	0.41
Iron(mg)	8	13.5±3.3	168	18	12.0±4.2	66.7	0.52
Magnesium(mg)	420	140.0±34.7	33.3	320	130.2±44.6	40.7	0.68

Table 5: Dietary Habits of the Respondents

Characteristics	Variables	Frequency(f)	Percentage %
Number of meals take per day	Once	4	2.0
	Twice	112	56.0
	Thrice	69	34.5
	More	15	7.5
	Total	200	100
Quantity of food eaten at a sitting	Very full	38	19.0
	Moderate	55	27.5
	Somewhat sufficient	105	52.5
	Total	2	1.0
	Total	200	100
Amount of time taken to finish a meal	Less than 10 minutes	69	34.5
	10-20 minutes	111	55.5
	20-30 minutes	16	8.0
	More than 30 minutes	4	2.0
	Total	200	100
Meal skipped	Breakfast	104	52.0
	Lunch	75	37.5
	Supper	11	5.5
	I don't skip meals	10	5.0
	Total	200	100
Reasons for skipping meal	Time	147	73.5
	Money	20	10.0
	Appetite	11	5.5
	Fasting	3	1.5
	Laziness	9	4.5
	Nil	10	5.0
	Total	200	100

Table 5: Dietary Habits of the Respondents Cont'd

Characteristics	Variables	Frequency(f)	Percentage %
Type of eating places do you frequently visit	Fast-Food	23	11.5

	Cafeteria	135	67.5
	Restaurant	18	9.0
	Other	24	12.0
	Total	200	100
How often do you eat	Everyday	36	18.0
	5-6 times in a week	26	13.0
	3-4 times in a week	42	21.0
	1-2 times in a week	78	39.0
	I don't eat out	18	9.0
	Total	200	100
Time at which you ate snacks	Between breakfast and lunch	55	27.5
	Between lunch and supper	60	30.0
	After supper	2	1.0
	Anytime	83	41.5
	Total	200	100
Eating snack while watching television	Yes	119	59.5
	No	81	40.5
	Total	200	100
The kind of food do you never eat	Beans	16	8.0
	Draw soup	12	6.0
	Cereal	22	11.0
	Pork	10	5.0
	Swallow	25	12.5
	Yam/potato	16	8.0
	Snail	17	8.5
	Egg	4	2.0

Vegetables	6	3.0
Nil	72	36.0
Total	200	100

Table 5: Dietary Habits of the Respondents Cont'd

Characteristics	Variables	Frequency	Percentage %
Reason against eating certain foods	Bad taste	10	5.0
	Taboo	5	2.5
	Allergic to them	19	9.5
	Never liked them	53	26.5
	Dislike their smell, shape or texture	35	17.5
	Others	78	39.0
	Total	200	100
Emotions affect the way you eat	Yes	129	64.5
	No	71	35.5
	Total	200	100
Exercise	Yes	176	88.0
	No	24	12.0
	Total	200	100
Afraid of getting overweight	Yes	64	32.0
	No	99	49.5
	Often	18	9.0
	Rarely	19	9.5
	Total	200	100
Believe in the in the	Yes	159	79.5

saying “You are what you eat”	No	41	20.5
	Total	200	100
Eat out of the campus yesterday	Yes	139	69.5
	No	61	30.5
	Total	200	100

Table 6: Relationship between the Nutritional Status and Dietary Diversity of the Respondents

CORRELATIONS			
	BAZ??	BMI	DDS
BAZ	1	.050	.160
		.688	.325
	66	66	40
BMI	.050	1	-.136
	.688		.404
	66	134	40
DDS	.160	-.136	1
	.325	.404	
	40	40	40

Conclusion and Recommendation

In conclusion, findings from this study show that majority of the respondents BMI was normal, and they also had medium dietary diversity score which means that the respondents still have to improve their dietary diversification.

Since high dietary diversity score is associated with consumption of fruit and vegetable groups;

it is recommended that fruits and vegetable consumption should be increased.

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