

# Nutritional Status of Lacto-ovo Vegetarian Young Adults of Babcock University in Ogun State

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## Abstract

Nutritional status is globally recognized as the means of determining the body's nutritional health. Several research findings had shown that there is an increasing rate of malnutrition as well as obesity across the globe. The practice of vegetarianism is recognized as one of the mechanism through which good nutritional status could be maintained. As nutritional health of adolescents and young adults most of whom are at the age of undergraduate studies has been acknowledged as being very important for supporting their growing bodies as well as prevent future health problems; many of them are reported to be engaging in habits that affect their nutritional health. The study therefore investigated the nutritional status of lacto-ovo vegetarian young adults of Babcock University, Ogun State, Nigeria. The study carried at Babcock University, Ilishan Remo Ogun State, Nigeria utilized a sample of 210 students. Samples of each cooked food served to the students were collected for each meal served during the whole week. Nutritional status of the respondents and the data from anthropometry measurements indicates that 67.59% were normal, 18.52% over-weight, 11.11% obese and 2.77% were underweight. Majority (70.41%) of the female respondents was Normal, 18.37% were overweight, and 9.18% were obese while 2.04% were underweight. From the overall nutritional status of the respondents based on Body Mass Index (BMI), majority (68.93%) of the respondents were normal, 18.45% were overweight and 10.19% of the respondents were obese while 2.43% were underweight. percentage of respondents that were below or above the Recommended Dietary Intake (RDI). For Energy, only 2% of the respondents were above the RDI, 97.1% were above protein RDI, 3% were above Iron RDI while the entire respondents were below the RDI for Calcium and Zinc.

## Introduction

Adolescence is the transition period between childhood and adulthood, a time of life that begins at puberty. For girls, puberty typically occurs between ages 12 and 13, while for boys it occurs between ages 14 and 15. It is one of the fastest growth periods of a person's life. The whole period of adolescence is from 13 to 17 years of age. Vegetarians tend to have lower Body Mass Index (BMI), type 2 diabetes, Iron deficiency anaemia, renal disease, osteoporosis, dementias such as Alzheimer's disease and other disorders [21, 22]. The physical changes of adolescence have a direct influence on a person's nutritional needs. Teenagers need additional calories, protein, calcium, and iron [11].

Vegetarianism is the practice of following a plant – based diet including fruits, vegetables, cereals, grains, nuts and seeds with or without dairy products and eggs. A vegetarian does not eat meat including: red meat, game, poultry, fish, crustacean, shellfish and products of animal slaughter such as animal derived gelatin and rennet [18]. Vegetarianism is considered a healthy viable diet. The American Dietetic Association and the Dietitians of Canada have found a properly planned vegetarian diet to satisfy the nutritional needs for all stages of life and large scale studies have shown that “mortality from ischemic heart disease was 24% lower in vegetarians than in non vegetarians [12].

“Vegetarian dietary patterns are quite diverse and variant due to food availability, region, age, gustatory reasons and religion and cultural beliefs. They encompass a wide range of plant products and food practices based on these factors and always begin with a plant based foundation” [1].

There is evidence that well-planned vegetarian diet provides numerous health benefits and is appropriate for all stages of life cycle [10]. Considering health hazards of consumption of protein rich diet deriving from animal sources, proportion of vegetarian or people consuming vegetable-based diet is increasing globally [6, 9, 13, 14].

Lacto-ovo vegetarians are allowed the consumption of milk which is a good source of calcium. However, Lacto-ovo-vegetarians, who consume diets which are generous in dairy products, should be advised to eat substantial amounts of iron-rich vegetables, grains, and legumes to minimize the inhibitory effect of calcium, and also to consume plenty of vitamin C-rich fruits to facilitate absorption of the non-heme iron. Vitamin C appears to enhance iron retention when calcium is consumed in the same meal [8].

There is a need to detect under nutrition in individuals and to assess the severity of the problem in the community [17]. The use of nutritional anthropometric measure serves as an indicator of under nourishment. Nutritional anthropometry addresses issues related to reference values and discusses cut offs based on relationship between functional impairment, morbidity and other consequences of food inadequacy. Since diet is a component of

health that can be modified fairly readily and specific nutritional guidance can be given to people to ensure adequate nutrition [19].

Studies have shown that adolescents who are vegetarians often engage in disturbed eating [4, 15]. Adolescents and young adults were found to be more likely to engage in binge eating with loss of control. However, that is there is no agreement on whether vegetarianism is the cause of disordered eating or whether is the manifestations of disordered eating (causal-symptomatic relationship) [1].

The concept that a well-balanced vegetarian diet can provide for the needs of a growing child and adolescent is supported by Canada's Food Guide, the American Dietetic Association and Dietitians of Canada, and the American Academy of Pediatrics [23]. A review of vegetarian diets based on ten studies found that vegetarians had lower intake than omnivores for only a few nutrients: vitamins B12 and C, calcium and zinc [7]. Overall conclusions were that vegetarian diets can be nutritionally adequate. Any nutritional deficits can be addressed by taking supplements, eating fortified foods, or preparing and combining foods to enhance absorption of vitamins and minerals [2]. The study therefore examined the nutritional status of Lacto-ovo vegetarian young adults of Babcock University in Ogun State.

## Materials and Methods

### Sample and Sampling Technique

The Study population comprised male and female students of Babcock University. According to the University records of 2015/2016 session, Babcock University had a student population of six thousand one hundred and ninety eight students (6, 198) out of which five thousand five hundred and seventy four (5, 574) were boarders.

The sample size for the study was calculated using [3].

$$N = 2(Za)^2 pq / d^2$$

Where N = sample size

$(Za)^2$  = level of confidence or the probability that the true percentage is within chosen value  $d = 1.96$

P = proportion or estimate of percentage of sampling frame.

$$q = 100 - p$$

d = level of precision (5%) required of results.

Hence, 210 student sample size at 5% level of precision was obtained. This study therefore used 210 boarding students as respondents for this study.

Two hundred and ten (210) healthy students were randomly selected for the study but Two hundred and six (206) questionnaires with matching anthropometry measurement and food intake were analyzed

### Data Collection

The data were collected using semi-structured questionnaire.

The questionnaire has information on (personal data, socio-economic and demographic, physical activities, dietary and food intake pattern, and 24-hour dietary recall). Self administered questionnaire written in English was administered to selected respondents.

Data were collected in the following ways:

### Anthropometry Measurements

#### a) Weight Measurement

Body weights were measured using bathroom scale. The scale was placed on a flat surface and the subjects were made to stand uprightly, barefooted, with minimum clothing. The reading was done in duplicate to the nearest 0.1 kg and the average weight was calculated.

#### b) Height measurement

Height measuring scale was used to measure the individual heights. The subjects were made to stand erect on the base plate without shoes, socks, head tie in order to give accurate distance between the sole of the feet and the crown of the head. As the subjects are looking straight, the head piece was sliced down to the head crown. The heights was taken to the nearest 0.1m and repeated to obtain the average value.

#### C) Body Mass Index (BMI)

This was determined by dividing the weight of each respondent in kilogram by the square of his height in meters (World Health Organization, 2009).

$$BMI = \frac{\text{Weight (Kg)}}{(\text{Height})^2 (\text{m}^2)}$$

#### Weighed Food Intake

All food taken by all respondents from the school cafeteria were measured. They were measured using a kitchen scale calibrated from 0 to 5kg to get the quantity of food intake. The quantity taken and plate waste were measured on a three day basis (one weekend day and two week days) per respondents.

#### Data Analysis

The data were scrutinized, cleaned, and then entered into the computer, for analysis using SPSS, version 20.0. The data generated were analyzed using descriptive statistics such as means, standard deviations, percentages and frequencies of respondent's characteristics. The differences between male and female respondents were determined using student's t-test.

## Results

### Respondents Personal Data

Table 1, shows the students' personal data, the ages of the students ranged from 16 to 25 years and above. Some (40.3 %) were 16-20 years of age, 46. 1% were 21-25 years of age while 13.6% were above 25 years of age. The mean age however was between 21-25 years. Over half (52.43%) of the respondents were male. Majority (85.4%) of the respondents was single,

**Table 1: Students personal data**

Age range (years)	Frequency (no)	Percentage (%)
16—20	83	40.3
21-25	95	46.1
>25	28	13.6
Total	206	100
<b>Sex</b>		
Male	108	52.43
Female	98	47.57
Total	206	100
<b>Marital Status</b>		
Single	176	85.4
Married	29	14.1
Widow	1	0.5
Total	206	100
<b>Religious Affiliation</b>		
Christianity	147	71.4
Islamic	47	22.8
Traditional	12	5.8
Total	206	100
<b>Tribe</b>		
Yoruba	84	41.78
Hausa	46	22.33
Igbo	63	30.58
Minority	13	6.31
Total	206	100
<b>Family Type</b>		
Monogamous	179	86.89
Polygamous	27	13.11
Total	206	100

14.1% were married, and 0.5% were widows. About 71% were Christians, 22.8% were Muslims, while 5.8% were traditionalists. About 42% of the respondents were Yoruba, 30.58% were Ibo, 22.33% Hausa and 6.31% were from the minority ethnic groups. Majority (86.89%) of the students were from monogamous families, while 13.11% were from polygamous families.

Table 2 below shows the nutritional status of the respondents and the data indicates that 67.59% were normal, 18.52% over-weight, 11.11% obese and 2.77% were underweight. Majority (70.41%) of the female respondents was Normal, 18.37% were overweight, and 9.18% were obese while 2.04% were underweight. From the overall nutritional status of the respondents based on Body Mass Index (BMI), majority (68.93%) of the respondents were normal, 18.45% were overweight and 10.19% of the respondents were obese while 2.43% were underweight.

**Table 2: Nutritional status of respondents**

Status	Frequency (no)	Percentage (%)
<b>Male Respondents</b>		
Under-weight	3	2.77
Normal	73	67.59
Over-weight	20	18.52
Obese	12	11.11
Total	108	100
<b>Female Respondents</b>		
Underweight	2	2.04
Normal	69	70.41
Overweight	18	18.37
Obese	9	9.18
Total	98	100
<b>Total status</b>		
Underweight (<18.5 kg/m <sup>2</sup> )	5	2.43
Normal (8.5 - 24.9 kg/m <sup>2</sup> )	142	68.93
Overweight (25.0 -29.9 kg/m <sup>2</sup> )	38	18.45
Obese (>30kg/m <sup>2</sup> )	21	10.19
Total	206	100

### Food Intake of Respondents

Table 3, shows account of the nutrient based on the food intake of the respondents. Only the protein intake was within the range of Male and Female Recommended Dietary Intakes (RDI). The Energy, Calcium, Iron and Zinc intake were below the RDI. However, considering the fact that respondents are vegans, the intake levels were moderate.

In table 4, The RDI of Nutrients covered by the meal consumed by the Male and Female respondents is shown. The Female covered 114.26% of the protein RDI while the Male covered 84.28% of the RDI which were significantly different. The Energy intake of the Male was 73.36% of RDI while that of the Female was 96.27% of RDI. The Calcium intake for both Male and Female covered 47.60% and 48.55% respectively. The Male Iron intake covered 65.40% and the Female Iron intake covered 39.33% while the Male intake of Zinc covered 43.20%, the Female intake of Zinc covered 54.83%. Generally, the Energy, Calcium, Iron and Zinc intake were not significantly different from Male to Female.

Table 5, gives the percentage of respondents that were below or above the Recommended Dietary Intake (RDI). For Energy, only 2% of the respondents were above the RDI, 97.1% were above protein RDI, 3% were above Iron RDI while the entire respondents were below the RDI for Calcium and Zinc.

**Table 3:** Nutrient intake of respondents

Nutrient	Intake	RDI	
		Male	Female
Energy (Kcal)	2118.75±89.22	2900	2200
Protein (g/day)	50.68±6.63	58	46
Calcium (mg)	573.97±178.69	1200	1200
Iron (mg)	6.22±2.07	10	15
Zinc (mg)	6.51±3.36	15	12

Source: Recommended Dietary Intake [24].

**Table 4:** The Mean and Percentage Nutrient Intake by Sex

Nutrient	Sex	Mean	% of RDI	T-Value	Sig
Protein	Female	52.56	114.26	2.53	
	Male	48.88	84.28	1.39	0.01*
Energy	Female	2118	96.27	0.34	
	Male	2139	73.36	0.28	0.05*
Calcium	Female	582.6	48.55	23.66	
	Male	571.2	47.6	28.07	0.01*
Iron	Female	5.9	39.33	21.27	
	Male	6.54	65.4	17.34	0.01*
Zinc	Female	6.58	54.83	26.77	
	Male	6.48	43.2	32.32	0.01*

\*Statistically significant ( $P \leq 0.05$ )

**Table 5:** Percentage of respondents below or above RDI

Nutrients	% Below RDI	% Above RDI
Energy	98	2
Protein	2.9	97.1
Calcium	100	0
Iron	97	3
Zinc	100	0

## Discussion

The study population was mostly Christians from monogamous family with a mean age of 21-25 years of age which is the age group for most university undergraduates. Most of the respondents were Yoruba given that Babcock University is located in the southwest, a Yoruba speaking geopolitical zone of Nigeria. The parents of the respondents were mainly from the literate class with post graduate education and high income earning who could afford the cost of a private university education.

The Nutritional status of the respondents showed that majority of them was normal while a few were either underweight or obese. When separated by sex, male and female respondents

were similar and the values close. The low activity pattern of the students may have resulted in the few obese respondents since a positive energy balance was recorded even when their nutrient intake was below RDI.

The results of this study showed that the nutrient intake of these students needs to be increased to meet the nutrient requirements of male and female students. Hence, the findings of this research support which says that vegans may need guidance on appropriate diet planning and food selection in order to achieve an adequate intake of bioavailable Iron and Zinc [23].

## Conclusion

The nutritional status of the respondents showed that over 50% of the study population was normal, although the nutrient intake of the respondents was generally below the RDI. The activity level of the respondents in relation to their energy intake gave a positive energy balance, which could be attributed to the high energy content of the breakfast meals.

## Recommendations

Foods that will give higher or additional nutrient to the student should be included in their daily meals thus adjusting the menu to support more intakes of the nutrients. Different varieties of fruits should be served with each meal, to improve on the nutritional status of the young adults.

Further studies on the nutritional status and a comparative study of pure vegans, Lacto-ovo vegetarians, non vegans could be carried out.

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