

Dietary Diversity Score and Nutritional Status of Undergraduates in South West Nigeria

Nupo S Sedodo^{1*}, Akinlotan JV¹, Akinlua O¹, Olunusi P Abosede² and Oguntoyinbo S Isaac¹

¹Food Technology Department, Moshood Abiola Polytechnic, Nigeria

²Home Economics Department, Tai Solarin University of Education, Nigeria

Abstract

Back ground: This study was carried out to assess the Dietary Diversity Score (DDS) and nutritional status of undergraduates students in south west Nigeria.

Methods: A representative sample of two thousand (2000) undergraduate students was surveyed from two Nigerian Polytechnics using simple random technique. A pretested interview guide was used to collect information. Information on dietary diversity was obtained using Food and Nutrition Technical Assistance Project questionnaire (FANTA). Body mass index (BMI) according to WHO classification was used in classifying nutritional status. Information on food intake was obtained from 24-hour dietary recall techniques. Dietary diversity score (DDS) was computed and the nutritional status was assessed. Data were analyzed using descriptive statistics; SPSS software package version 16.0.

Results: The result of the BMI showed that 3% of male students were underweight, 46% of male students had normal weight, 5% of the female were overweight while 2% of the female students were obese. DDS of the subjects showed that Cereals and grain group consumed by male was $0.40 \pm .01a$ while female scored $0.43 \pm 0.2a$, seeds, nuts and legumes consumed by male were $0.53 \pm .11a$ while female had $0.52 \pm 0.1a$ score. Mean score of starchy, roots and tubers consumed by male and female were $0.63 \pm 0.2a$ and $0.67 \pm 0.9a$ respectively, vegetables group for male were $0.63 \pm 0.23b$ while female had $0.66 \pm 0.3b$, of the fruits group $0.50 \pm 0.2a$ was scored by male while female scored $0.56 \pm 0.17b$, out of the meat and meat products scored male scored $0.17 \pm 0.3a$ while female had $0.21 \pm 0.3b$, mean of the fish and sea foods shows that male scored $0.60 \pm 0.b$ while female scored $0.86 \pm 0.2a$. Oil and dairies group shows that male scored $0.61 \pm 0.5a$ while female scored $0.62 \pm 0.9a$. The total dietary diversity score for male was $4.07 \pm 1.84a$ while female had $4.53 \pm 3.07a$. DDS of male were higher than female ($P < 0.05$). The dietary diversity terciles revealed that the male and female scores were within the low tercile (1-4)).

Conclusion: The subjects had low DDS with few students were malnourished

Keywords: Diversity; Nutritional status; Dietary

Introduction

Dietary diversity- i.e., the number of foods consumed across and within food groups over a reference period- is widely recognized as being a key dimension of diet quality. It reflects the concept that increasing the variety of foods and food groups in the diet helps to ensure adequate intake of essential nutrients, and promotes good health. There is ample evidence from developed countries showing that dietary diversity is indeed strongly associated with nutrient adequacy, and thus is an essential element of diet quality [1].

Food consumption pattern not only affect an individuals' well being but also have implications for the society as a whole [2]. It is documented that the choice of which food to eat, where to eat and when to eat are intensely personal and influenced by several factors which in turn influence an individual's needs [3]. Young adults have special nutrients needs for growth and have been shown not to meet the dietary recommendation for their age [4]. Globally, there is evidence that approximately 2 billion people suffering hidden hunger which has devastating effects and significantly contributes to the global burden of disease [5]. Anthropometric measurements are vital tools used for proper monitoring and management of human health [6]. In medical anthropology and epidemiology, it is useful in the determination of the relationship between various body measurements and medical outcomes [6]. This study aimed at determining the dietary diversity score of the undergraduates and their nutritional status.

Materials and Methods

A cross sectional study was carried out in Ogun state and Lagos state, South west Nigeria. A structured pretested questionnaire

was used to randomly select two thousand undergraduate students from Moshood Abiola Polytechnic and Lagos state Polytechnic. The questionnaire form was adapted from FANTA [7].

24-hour dietary recall

This was done using the interview methods; subjects were asked to recall what meals and drinks they had taken for the previous 24 hours. This information included details of amount consumed, which were estimated in household measures, estimated amount, and other snacks consumed.

Anthropometric measurements

A Heightometer was used to measure the subjects' height and the subjects' weight was measured using a bath room weighing scale. The reading was done in triplicates to the nearest 0.1 kg to ensure accuracy and the average weight was determined. Body Mass Index was calculated as weight in (kg) divided by squared height in metre and compared with the WHO [8].

***Corresponding author:** Nupo S Sedodo, Food Technology Department, Moshood Abiola Polytechnic Ojere Abeokuta, Nigeria, Tel: +23480529628; E-mail: sundaynupo@yahoo.com

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Dietary diversity pattern

To score the dietary diversity pattern eight [9] main groups of food were used i.e. cereals and grains, seeds, nuts and legumes, starchy roots and tubers, vegetables, fruits, meat and meat products, fish and sea foods, Oil/dairies as classified by FANTA [7] with little modification. These main groups were divided into various groups according to Foote et al. [1] with little modification as cereals and grains into (refined bread, maize, millet, rice, wheat, sorghum, refined wheat). Legumes, seeds and nuts were divided into (nuts, melon, locust beans and legumes), starchy roots and tubers were divided into (cassava products, tubers, starchy roots). Vegetables were divided into (green vegetables, tomatoes, carrot, and vegetable products). Fruits were divided as (berries, fruits, citrus and fruit juice). Meat and meat products were divided into (red meat, poultry, games, meat products). Oil/dairies were divided into (milk, cheese, yoghurt, egg, oil)

To be counted as a consumer for any of the food group categories, a respondent had to consume at least one-half serving as defined by food guide pyramid quality criteria during one day. It did not need to be eaten all at once. Each of the eight broad food categories received a maximum diversity score of 2 out of 16 possible score points. For calculation of the score of each group, the number of sub group consumed was divided by the total number of subgroups in each main group then multiplied by 2. For example, if a person consumed at least one serving from two of seven possible cereal and grain categories, he/she would receive a subgroup score of $2/7 \times 2 = 0.57$ and if a person consumed at least one serving from two of four possible meat categories, he/she would receive a subgroup score of $2/4 \times 2 = 1$. Within each of the food groups, the score

Variable BMI Category	Male Frequencies (%)	Female Frequencies (%)
Underweight (<18.5)	38 (2)	51 (3)
Normal weight (18.5-24.9)	924 (46)	770 (38)
Over weight (25.0-29.9)	59 (3)	91 (5)
Obes (30.0-34.9)	21 (1)	46 (2)

Table 1: Nutritional status of the subjects.

Food	Male	Female	P Value
Energy (kcal)	2888 ± 37a	2777 ± 14a	0.35
Protein (g/day)	10 ± 82b	20 ± 5.5a	0.18
Fat (g/day)	20 ± 9.7a	26 ± 28a	0.49
Carbohydrate (g/day)	179 ± 146a	183 ± 80b	0.30
Polysaccharides (g/day)	147 ± 97a	142 ± 7a	0.78
Fibre (g/day)	22 ± 18a	30 ± 49a	0.54

Table 2: Mean of macronutrient intake of the subjects.

Food group	Male	Female	P Value
Cereals and Grains	0.40 ± .01a	0.43 ± 0.2a	0.23
Seeds, Nuts and Legumes	0.53 ± .11a	0.52 ± 0.1a	0.91
Starchy Roots and Tuber	0.63 ± 0.2a	0.67 ± 0.9a	0.01
Vegetables	0.63 ± 0.23b	0.66 ± 0.3b	0.44
Meat and Meat Products	0.17 ± 0.3a	0.21 ± 0.3b	0.05
Fish and Sea Foods	0.60 ± 0.b	0.86 ± 0.2a	0.01
Oil and Dairies	0.61 ± 0.5a	0.62 ± 0.9a	0.75
Total	4.07 ± 1.84a	4.53 ± 3.07a	0.04
Dietary Diversity Terciles			
Low (1-4)	4.07±1.84a	4.53±3.07a	
Medium (5-9)	NA	NA	
High (10-14)	NA	NA	

Means with different letters are significantly different

Table 3: Mean Dietary Score of the Subjects.

reflects the percentage of possible maximum score [10]. Total score was the sum of the scores of the eight main groups.

Results

Nutritional status of the subjects

Table 1 presents the nutritional status of the subjects. Only 5 % of the subjects were underweight (BMI<18.5), out of which 3% were female. Also, 84% of the subjects were of normal weight (BMI = 18.5-24.9), and 46% of them were males. Few (8%) of the subjects were overweight and (3%) were obese.

Mean of macronutrient intake of the Subjects

Table 2 shows that the mean of the energy, protein, fat, carbohydrate, polysaccharides and cholesterol intake of male and female respectively; energy (2888 ± 37a and 2777 ± 14a), Protein (10 ± 82b and 20 ± 5.5a), Fat (20 ± 9.7a and 26 ± 28a), carbohydrate (179 ± 146a and 183 ± 80b), Polysaccharides (179 ± 146a and 183 ± 80b), fibre (22 ± 18a and 30 ± 49a)

Mean dietary diversity score of the subjects

Table 3 shows the mean dietary diversity score of the subjects. Cereals and grain group consumption by male was $0.40 \pm .01a$ while female scored $0.43 \pm 0.2a$, seeds, nuts and legumes consumed by male were $0.53 \pm .11a$ while female had $0.52 \pm 0.1a$ score. Mean score of starchy, roots and tubers consumed by male and female were $0.63 \pm 0.2a$ and $0.67 \pm 0.9a$ respectively, vegetables group for male were $0.63 \pm 0.23b$ while female had $0.66 \pm 0.3b$, of the fruits group male scored $0.50 \pm 0.2a$ while female scored $0.56 \pm 0.17b$, out of the meat and meat products scored male scored $0.17 \pm 0.3a$ while female had $0.21 \pm 0.3b$, mean of the fish and sea foods shows that male scored $0.60 \pm 0.b$ while female scored $0.86 \pm 0.2a$. Oil and dairies group shows that male scored $0.61 \pm 0.5a$ while female scored $0.62 \pm 0.9a$. The total dietary diversity score for male was $4.07 \pm 1.84a$ while female had $4.53 \pm 3.07a$. Dietary diversity score of male were higher than female ($P < 0.05$). The dietary diversity terciles revealed that the male and female scores had low dietary tercile [1-4].

Discussion

The result of the body mass index of the subjects revealed that more female were overweight than male. The sex-specific and combined sex overweight (BMI = 25 kg/m²) prevalence rate among young people was reported from sixty-six countries [11].

Overweight and obesity prevalence was relatively higher among the female undergraduates than male undergraduates. There existed considerable worldwide and regional variations in the overweight prevalence rate. The coexistence of high and low levels of overweight and obesity are found in both developed and less developed countries within the same region [12]. The significant heterogeneity within each geographical region can be explained by reported gender differences. For example in the African region, obesity prevalence rates range between 0.06% among Ghanaian males to 33.0% within the Egyptian female population [13]. Nationally representative sex-disaggregated data presented female overweight and obesity rates higher than men [12]. Contrary to the study among Lebanese undergraduates [14] and other studies [12-14] overweight were common in male than female students.

The mean energy and protein intakes of the students were below the recommended daily allowance. This observation could be due to

dependency of the students on their parents and present predicament of most students, ability not to cook food at home

The dietary diversity score of the subject was poor. This finding is related with the similar work carried out on rural women by Nupo et al. [15] who reported that the dietary diversity score of the rural women was low but contrary to the study of Nupo et al. [16] on breastfeeding mother who had good dietary diversity score This poor dietary diversity score observed among the students could be attributed the undergraduates' present status of being student.

The mean energy and protein intakes of the students were below the recommended daily allowance. This is in agreement with similar research work of Savy et al. [17] who observed the same in Benin Republic though among the rural women. This observation could be due to dependency of the students on their parents and present predicament of most students' ability not to cook food at home; this is in agreement with similar research work of Savy et al. [17] who observed the same in Benin Republic though among the rural women. The dietary diversity within the food group of Meat and Meat Products received a poor score. This could be due to the students financial constrains.

Conclusion

The dietary diversity score of the subjects was and the energy and protein intake was also below the recommended allowance. Therefore the dietary diversity score and nutrient intake must be improved.

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