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Assessment of Nutritional Status of Undergraduate Students in Tertiary Institutions in Lagos State

Tinu Lano-Maduagu
Department of Science and Technology Education
Faculty of Education, University of Lagos

Abstract

Malnutrition is one of the major public health problems among undergraduates in Nigeria tertiary institutions. This study was carried out to assess the nutritional status of undergraduate students in three tertiary institutions in Lagos State. A cross-sectional, descriptive study design was used and a total number of one hundred and twenty undergraduate students were purposively and randomly selected in the study, they were classified into 3 groups according to age ('below 20 years', '20-24 years' and '25years above'.) Questionnaire and interview were used to collect data on socio-economic status of the subjects, dietary intakes (24 hours dietary recall and food frequency) and anthropometric measurements were taken and body mass index calculated. The results were analyzed using SPSS version 22.0. The result of the anthropometric measurement (BMI) was compared with WHO standard (2002) and it revealed that 1.7% of 'the subjects were severely underweight, 7.5% were underweight, 69% were normal and 17.5% were overweight, while 4.3% were obese. Their dietary intake in accordance with RDA revealed that some of the subjects that satisfied the RDA for calcium and vitamin A did not satisfy the requirements of protein and vitamin B6 which may be as a result of their skipping meals. In view of these findings, it is recommended, among others, that nutrition education should be included in the general courses taught in tertiary institutions in Lagos State.

Keywords: *Undergraduates, Nutritional status, Dietary intake, Anthropometric, Socio-economic status.*

Corresponding Author: Tinu Lano-Maduagu

Background to the Study

Nutritional status is the combination of health as influenced by intake and utilization of nutrients and determined from information obtained by physical, biochemical and dietary studies (Gibson, 2005). Nutritional assessment is thus the system of determining condition of nutritional health of a person or a group of people. Malnutrition constitutes the most serious risk factor in causing ill health and death (Muller & Krawinkel, 2005). Its incidence during early childhood has irreversible negative effects on the intelligence, educability, disease resistance and productivity. WHO (2003) see malnutrition as a serious public health problem that has been linked to a substantial increase in the risk of mortality and morbidity. Malnutrition has damaging implications for people and communities, thus hindering the socio economic and human development of a nation. It remains one of the most critical health issues because of its long-lasting negative effects. WHO (2002) and FAO (2004) estimated that 852 million people are undernourished worldwide with most (815 million) living in developing countries. This confirms the ever increasing figure of people that are undernourished globally.Broadly speaking, undergraduates (adolescents and young adults) problems are malnutrition, micro-nutrient deficiencies and nutrition related chronic diseases. This is because undergraduates students tend to practice poor eating habit (Abolfotouh et al 2007).The transition from adolescence to adulthood is an important period for establishing behavioral patterns that affect long –term health and chronic diseases (MegSmall, Bailey-Davis & Maggs,2013). Undergraduate students who are mostly late adolescents and young adults are affected by this nutritional transition (Baldini, Pasqui, Bordoni, 2009). Wide disparities in the relative magnitude of these problems are likely even within a given region or country, with a direct bearing on priorities. Nutrition problems arc health problems; their prevention and control lie, to a large extent, outside the health sector. There is widespread recognition of the critical role that economic constraints and food system play. Bottlenecks play in contributing to poor nutritional health, in addition to socio-cultural pressures and lack of education. Nutrition cuts across many sectors; and nutrition action calls for strong inter-sect oral links particularly among health, nutritionist and agriculture.

The nutritional status of most Nigerian undergraduates is not the best; indeed, it needs urgent attention (Oguntona, 2008). Undergraduates (adolescent and young adult) being the largest proportion of Nigeria population are likely to be greatly affected. There have been few population based studied examining the prevalence of malnutrition among undergraduates. Similarly, research on the long-term cognitive and health efforts of malnutrition during adolescent has been inadequate (AIHW, 2007). The undergraduates tend to consume much of the carbohydrate, fat and oil contents of food than other nutrients that can also work hand in hand to promote their health and growth during this period.

This study is, therefore, intended to assess the nutritional status of undergraduate students in Lagos tertiary institutions using anthropometric and dietary method.

Objectives of the Study

1. To find out the socio demographic data of the respondents.
2. To determine various anthropometric measurements of the respondents (Weight, Height and BMI).
3. To determine the usual dietary intake of the respondents using 24 hour dietary recall and food frequency questionnaire.

Research Questions

1. What is the demographic data of the respondents?
2. What are the various anthropometric measurements of the respondents?
3. What is the usual dietary intake of the respondents using 24hour dietary record?

Methodology

The population of this study consists of undergraduates in three tertiary institutions (Adeniran Ogunsanya College of Education OtoIjanikin; Lagos State University, Ojo and University of Lagos, Akoka). The sample for the study consists of 40 (forty) undergraduates each from the selected institution, i.e, Adeniran Ogunsanya College of Education, Oto Ijanikin; Lagos State University, Ojo and University of Lagos, Akoka. The three institutions were purposefully selected for the study while the forty (40) students in each school were randomly selected. Prior to the commencement of the field work, permission was sought and obtained from the local government areas and selected schools. In addition, verbal/written consent was obtained from the respondents in various schools. Pre-test, structured questionnaires and interview were used for data collection. Anthropometric measurement of height and weight were also taken to determine the subjects' body mass index. The instruments used in collecting data were questionnaire, oral interview and anthropometric measurement of height and weight (BMI)

Anthropometries Measurement

Aset of anthropometries measurement taken from each subject as described below:

Weight*:* A portable scale was used for weight measurement, while each subject had on light outdoor clothing without shoes and beret and the scale used was adjusted to zero before each use. While standing on the scale, the reading was collected by the researcher.

Height*:* An available cement floor level and height stand was used to measure the height of the age group as it is expected in the project. The height measurement was obtained by the subjects standing erect on a flat solid floor without shoes and beret, arms hanging by the sides, ankles and knee together bullocks, marked wall. A ruler firmly placed on the subject head lo locale the exact height on the wall. While reading was taken to the nearest O.lm.

Body Mass Index*:* The body mass index was calculated using formula Wt/Ht^2

Dietary Assessment

Information about the food consumed amongst the undergraduate students in the selected institutions in Lagos Slate was collected using 24 hour dietary recall and food frequency.

The Socioeconomic Status

The socioeconomic status of the subjects was determined using structured questionnaire.

Data Analysis

The body mass index (BMI) was calculated using the formula Wt/Ht^2 meters and the food intake was converted into emerged and nutrient content using the F.A.O (1980) food

composition table for use in Africa. The Recommended Dietary Allowance (RDA) was used to evaluate the adequacy of their intake while the result was interpreted into percentage including socioeconomic background and demographic information.

Result

The result of the study was classified into different sections which include socio-demographic data of the respondents, lifestyle and food habits of the respondents, the mean intake of (the subjects within the last 24hours and the mean intake of nutrients of male and female.

Table 1: Socio-Demographic Data of the Respondents

Distribution of Respondentsby Institution	**Freq.**	*%*
AOCOED	40	33.3
LASU	40	33.3
UNILAG	40	33.3
Total	**120**	**100.0**
Number of students considered in each level		
100	30	25.0
200	27	22.5
300	31	25.8
400	26	21.7
500	6	5.0
Total	**120**	**100.0**
Distribution of the Respondents by Sex		
Male	74	61.7
Female	46	38.3
Total	**120**	**1 00.0**
Distribution of the Respondents by Marital Status		
Single	112	93.3
Married	8	6.7
Total	**120**	**100.0**

Table 1 showed the three (3) institutions featured in the study with the same percentage (33.3%) of subjects from each school. Also, it shows that majority (25.8%) of the students are in 300 level while 25.0% of the students in 100 level and 22.5% of the subjects in 200 level. The percentage of subjects in 4001evel is 21.7% while 5.0% in 500 level. On table 1, it shows that 61.7% were female while (he remaining 38.3% were male. It also appeared on table 1 that 93.3% of the respondents were single while the remaining 6.7% were married undergraduate students. Figure I shows that 30.8% of the respondents were below 20 years of age, 55.9% were between 20 - 24 years while the remaining 13,3% were 25 years and above.

Figure 2 revealed that majority (36.7%) of the subjects' parents are civil servants. 35.9% of the subjects' parents are traders; while 5.8% engage in food vending, 7.5% arc hairdressers and 8.8% are contractors. The remaining 5.3% engage in tailoring.

Figure 3 revealed that majority (32.5%) of the subjects are collecting monthly allowance between N5.000 - N10.000 while 25.8% of the subjects earn allowance above N20,000 per month. Some (20%) earn allowance below N5,000 and 12.5% of the subjects earn allowance between N-10,000 to N-15,000 while the remaining subjects (9.2%) earn between Nl5,000-N20,000 as their monthly income allowance.

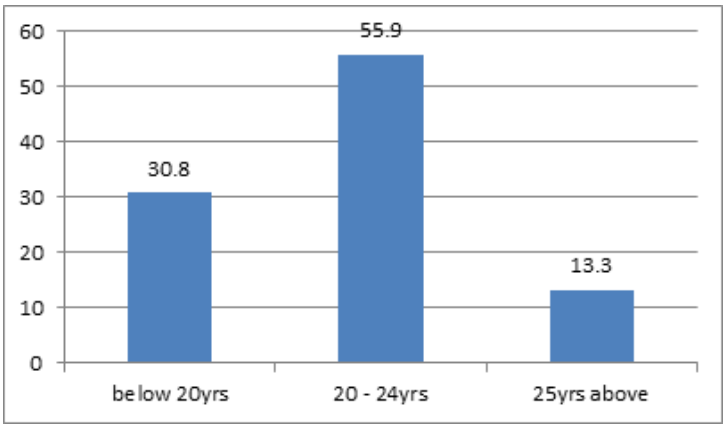

Figure 1: Distribution of the Respondents by Age

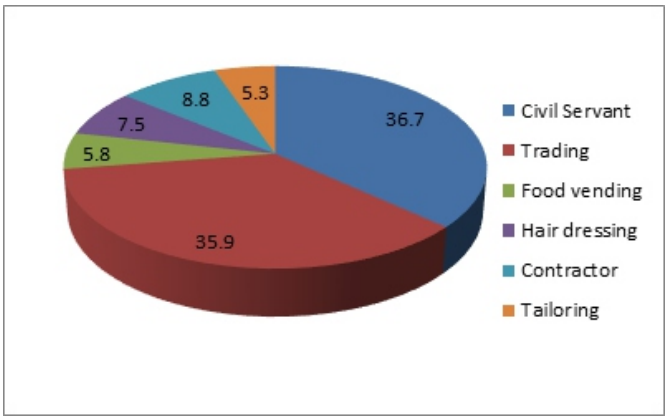

Figure 2: Occupation of the Parents of the Subjects

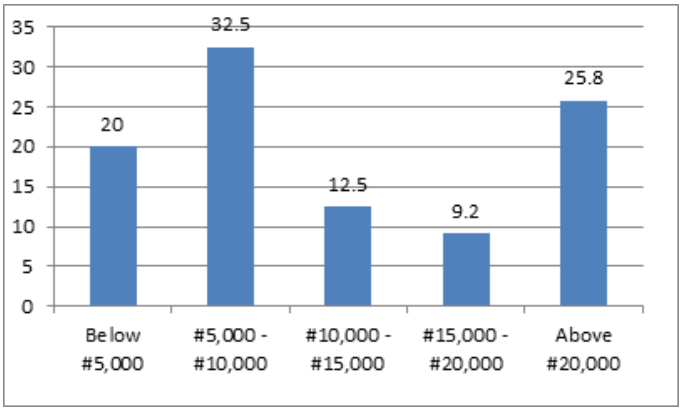

Figure 3: Monthly Allowance of the Students

Table 2: Lifestyle and Food Habit of the Respondents

How Many Times They Eat in a Day	**Freq.**	**%**
Once	3	2.5
Twice	14	36.7
Thrice	52	'43.3
More than 3 limes	21	17.5
Total	**120**	**100.0**
Skipping of Meal		
Yes	63	52.5
No	57	47.5
Total	**120**	**100.0**
Reasons for Skipping Meal		
Lecture/class factor	10	15.0
Tiredness/stress	06	9.5
Busy/lime	21	33.4
Weight reduction	07	111
Loss of appetite	08	12.6
Money or resources	11	17.6

On table 2, it shows that 43.3% of the respondents eat three times a day, 36.7% eat twice a day while 2.5 % of the undergraduates eat once a day and the remaining 17.5% eat more than three times in a day.

Table 2 indicates that 52.5% of the respondent's skip meal while 47.5% do not skip their meals.

Also on table 2,33.4%) of the undergraduate's skip meal because of tight schedule, 17.5% as a result of insufficient resources or money while 15.9% skip meal because of lecture time. Some (11.1%) skip meal for weight reductions while the remaining (12.6%) skip meal as a result of loss of appetite.

Table 3a: The Mean Intake of the Subjects within the Last 24 Hours

Food Consumed/ Day	Mean (g/Day)
Spaghetti	26.9
Custard	24.2
Seinolina	5.1
Indomie	56.1
Rice	76.9
Biscuit	34.4
Plantain	18.3
Eba	23.1
Fufu	7.7
Gam	10.4
Porridge	4.1
Bread	68.7
Doughnut	7.0
Sausage roll	67.7
Bean cake	16.2
Beans	56.6
Groundnut	8.8
Melon	1.3
Ogbono	2.7
Amaranthus(Cooked)	2.3
Pumpkin (cooked)	15.32
Jews mallow(Ewedu)	7.56
Garden egg	3.2
Orange	10.5
Apple	14.8
Cucumber	5.6
Banana	19.9
Peak milk	15.6
Cowbell milk	5.6
Viju milk	2.4
Bournvita	4.6
Milo	6.1
Nicevita	2.2
Beef	19.2
Egg	3.4
Fish	33.2
Fish roll	3.0
Crayfish	2.3
Butter	0.98
Margarine	2.44

Table 3b: The Mean Intake of the Subjects within the Last 24hours

Food Consumed/Day Meals	Mean (g/Day)
1. Rice + Stew	87.04
2. Jollof rice 16.10	
3 , Pounded Yam + Vegetable+Meat	28.34
4. Stew	28.55
5. Bread + Beans	72.30

The Frequency of Subjects That Satisfy the Recommended Dietary Allowance

The subject's nutrient intake was categorized into two sections (below and above the recommended allowance) using the recommended dietary allowance by "National Academy of Sciences (2001) as a reference standard.

The result of energy (kcal) supplied by the food consumed by the subjects are shown on table 4; it appeared that 83.3% of the male subjects were within the recommended allowance while energy supplied by the food consumed by 36.7% were below the recommended allowance for energy. The result of intake of protein shows that 25.0% of the male subjects did not satisfy the recommended intake for protein while 75,0% consumed more than 56g of protein.

As shown on table 9, 16.7% of the male subjects satisfy less than l000mg of calcium which is lower than the recommended intake while 83.3% satisfy the requirement of calcium. The iron intake was shown on table 9; it appeared that 66.7% of the male subjects satisfy the requirement of iron while the remaining 33.3% do not. The number of respondents that satisfy the requirement of magnesium was 75.0%. As indicated on table 9, it shows that 66.7% satisfy the requirement of vitamin 1312 while 58.3% and 91.7% satisfy the requirements of vitamin B6 and Vitamin A respectively.

Table 4a: The Frequency of Subjects That Satisfy the Recommended Dietary Allowance

RDA	Freq.	Percent (n=12)
Energy (kcal)		
<3000	2	16.7
>3000	10	83.3
Total	**12**	**100.0**
Protein (g)		
<5G	3	25.0
>56	9	75.0
Total	**12**	**100.0**
Calcium (nig)		
<1000	2	16.7
>1000	10	83.3
Iron (ing)		
<8	4	33.3
>8	8	66.7
Total	**12**	**100.0**
Magnesium		
<400	3	25.0
>400	9	75.0
Total	**12**	**100.0**

Table 4b: The Frequency of Subjects That Satisfy the Recommended Dietary Allowance

Range	Freq.	Percent (n=12)
Vitamin B12		
<2.4	4	33.3
>2.4.	8	66.7
Total	**12**	**100,0**
Vitamin B6		
<1.3	5	41.7
>1.3	7	58.3
Total	**12**	**100.0**
Vitamin A		
<900	1	, 83
>900	11	91.7
Total	**12**	**100.0**

The Frequency of Female Subjects That Satisfy the Recommended Dietary Allowance

The subjects' nutrient intake was categorized into two sections (below and above the recommended allowance) using the recommended dietary allowance by National Academy of Sciences (2001) as a reference standard. The result of energy (kcal) supplied by the food consumed by the subjects are shown on table 5, it appeared that 75.0% of the female subjects were within (he recommended allowance while energy supplied by the food consumed by 25.0% were below the recommended allowance for energy. The result of intake of protein shows that, 33.7% of the female subjects do not satisfy the recommended intake for protein, while 66.3% consumed more than 56g of protein.

As shown on table 10, 16.7% of the female subjects satisfy less than l000mg of calcium which is lower than the recommended intake while 83.3% satisfy the requirement of calcium. The iron intake was shown on table 9; it appeared that 66.7% of the male subjects satisfy the requirement of iron while the remaining 33.3% do not. The number of respondents that satisfy the requirement of magnesium was 83.3%.

As indicated on table 9, it shows that 53.3% satisfy the requirement of vitamin B12 while 58.3%> and 83.3% satisfy the requirement of vitamin B6 and Vitamin A respectively.

Table 5a: The Frequency of Female Subjects That Satisfy the Recommended Dietary Allowance

Range	Freq.	Percent (n=12)
Energy (kcal)		
<3000	3	25.0
>3000	9	75.0
Total	**12**	**100.0**
Protein (g)		
<56	4	33.3
>56	8	66.7
Total .	**12**	**100.0**
Calcium (ing)		
<1000	2	16.7
>1000	10	83.3
Iron(mg)		
<8	4	33.3
>8	8	66.7
Total	**12**	**100.0**
Magnesium		
<400	2	16.7
>400	10	83:3
Total	**12**	**100.0**

Table 5b: The Frequency of Female Subjects that Satisfy the Recommended Dietary Allowance

Range	Freq.	Percent (n=12)
Vitamin B12		
<2.4	5	46.7
>2.4	7	53.3
Total	**12**	**100.0**
Vitamin B6		
<L3	5	46.7
>1.3	7	53.3
Total	**12**	**100.0**
Vitamin A.		
<900	9	16.7
>900	10	83.3
Total	**12**	**1 00.0**

Table 6: Mean Intake of Nutrients of Male

Age cohort (Yrs)	Caloric (g)	Protein (g)	Iron (mg)	Magnesiun (mg)	Calcium (mg)	Vit A (ug)	Vit B((ug)	Vit B12 (ug)
<20	3800+175	72±25	10+2	398+65	1400+10	709+43	1 .4.+0.6	2.4±1.2
20-24	2980±205	68+17	8±1	358±59	932+56	1250+98	1.6+0.8	3.5±1.3
25above	2650+478	59+11	7±2	398±45	1005±67	806+45	1.3±0.2	2.6+0.7

Table 7: Mean Intake of Nutrients of Female

Age cohort (Yrs)	Caloric (g)	Protein (g)	Iron (mg)	Magnesiun (mg)	Calcium (mg)	Vit A (ug)	Vit B((ug)	Vit B12 (ug)
<20	2270+267	62+25	15+4	355±45	1250±97	509+43	0.6±0.1	2.5±1.2
20-24	24350+29	69+27	18+7	368±61	1020±82	732+56	1.6+0.3	2.8±1.7
25above	2043+178	59+17	17+6	345+48	1005±67	506+23	1.3±0.2	2.6+1.5

Table 8: Consumption of Fruit

Daily Consumption of Fruit	**Freq.**	**Percentage**
Yes	71	59.2
No	49	40.8
Total	**120**	**100.0**
Frequency of Fruit Consumption		
Once	33	46.5
Twice	28	39.4
Thrice	6	8.5
More than 3 times	4	5.6
Total	**71**	**100.0**

From table 8, it could be observed that 59.2% of the students consumed fruit daily while 40.8% of the students did not.

Table 8 shows, that 46.5% of the undergraduates always cat fruit once in a day, 39.4% of (hem take it twice while 8.5% take it three times a day and the remaining lake fruit more than 3 times a day (5.6%).

Table 9: Interpretation of Height and Weight into BMI Categories

BMI Categories	Freq.	%
Severely underweight (< 1 6.	2	1.7
Underweight(<18.5)	9	7.5
Normal (18.5-24.99)	83	69.0
Overweight (25-29.99)	21	17..5
Obese 1 (30-34.99)	4	3.3
Obese 11 (35-39.99)	1	1.0
Total	**120**	**100.0**

According to World Health Organisation data (2000) as revealed on table 9, 69% of the respondents were normal in their BMI categories, 17.5%were overweight and 7.5% were underweight while 3.3% were Obese I, some were severely underweight (1.7%) while 1% of the respondents falls under the categories of Obese II.

Discussions

The result of the study shows that 43.3% of the subjects ate three times a day, 36.7% twice a day; 2.5% once a day and 17.5% more than three times a day. Oguntona (2008) asserted that food is the raw material from which our body make right amount of food to ensure good health, which may be evident in our appearance, efficiency and emotional well-being. They went further to say that the importance of three square meal cannot be overemphasized in the growth and development of human being especially during the period of adolescents and young adults. They concluded that food is the inner engine that produces good health which leads to wealth. Not eating adequately may be a major reason why some of the subjects were malnourished. The findings revealed that majority of the students skip meals due to one reason or other; this is in line with the findings of (Abdull Hakim 2012) who found in his study high percentage of student that skipped meals. Skipping meals is often seen as attractive way to lose weight among undergraduates; unfortunately, the side effects of skipping meal are made more serious than any potential benefit. Some consequences of skipping meals can include promoting the development of diabetes, inadequate nutrition and drastically altering the way that your body digests food. Generally people tend to overeat after the skipped meal and in most cases it causes overweight.

According to the World Health Organization (2003), skipping meal for any reason is unhealthy due to three reasons which include blood sugar drops and spikes; inadequate nutrition and altered metabolism. The findings also revealed that 45% of the respondents consumed rice (cereal) as most consumed food due to the lesser time it takes in preparation and it is the most commonly found food in Africa; 10.8% went for solid food like swallows; 15% went for indomie and 29.2% of the respondents went for beans and bread, majority of which were male respondents because of their nature in preparing food and the longer time the food takes lo digest in the body system. United States National Health and Nutrition examination survey (2002) revealed that the perception of students towards food consumption shows that majority of the students always go for less time prepared food,

readymade food commonly found in the environment like rice, Indomie, snacks and food that can stay or hold stomach for longer lime before digestion. This is due to their nature of job/occupation as students.

Moreover, it is also revealed that majority of respondents do not consume fruits and vegetables on frequent basis. This was in agreement with the findings of Rodriges et al (2009) in a study on Vegetable consumption and factors associated with increased intake among college students. Fruits and vegetables are full of antioxidant and low in calories and fat content. A healthy diet should contain all the seasonal fruits as a single fruit may not supply the entire nutrient required. The dietary assessment conducted among the subjects shows that most of the respondents satisfy more than 50% of the RDA for energy. The energy contribution of the fat for most of the respondents was higher than the dietary goal for it (not more than 30% of total calorie needed in a day) with more of female subjects having higher figure as compared with male counterparts in all the schools. This result is in conformity with several studies (Abdull Hakim, 2012); though, the micronutrient status of most respondents was low when compared with RDA, most especially for calcium and vitamin C.

Furthermore, it also revealed that most of the subjects (undergraduates) do not satisfy the requirement of protein in their daily diet, Abdull Hakim et al (2012) said body needs foods rich in protein everyday because, unlike some other nutrients, it cannot be stored in the body, which means that if protein is consumed more than necessary, the body will simply cause it to pass through the system. The interpretation of the anthropometric measurement of the subjects, i.e. BMI revealed that majority of the subjects are normal in their BMI, while others were severely underweight, underweight, and obese. According to World Health Organisation data (2003), BMI less than 18.5 is underweight and may indicate malnutrition, an eating disorder or other health problem, while a BMI greater than 25 is considered overweight and above 30 is considered obese. This finding is similar to the work of Delvarionzadeh et al (2016) on Assessment of Nutritional Status and its related factors among Iranian University Students who found some cases of malnutrition including both underweight, overweight and obesity among undergraduate students . Never the less it is important to note that anthropometric measurements vary significantly worldwide. The basic objectives of anthropometric assessment are to provide an estimate of the prevalence and severity of malnutrition. The information collected can then be used for the formulation of health and development policies.

Conclusion

This study showed that lack of simple knowledge of nutrition, insufficient resources, time/lecture, weight reduction and loss of appetite are the problems facing the nutritional intake of the undergraduate students. The knowledge of nutritional status of the adolescent is of importance as poor nutrition cannot contribute to the development and maintenance of their status.

Recommendations

On the basis of findings as recorded, the recommendations below should be taken into consideration. It is believed that it would solve some of the problems to a considerable extent. Government should help to provide useful information about current dietary practice to the undergraduate students.

There should also be enlightenment to the general populace that nutritional foods (adequate diet) are not really expensive. Also, a better understanding of adequate diets and eating behaviours is essential for relevant education programmes.

Additionally, dietary enquiry tools specifically designed for undergraduates are direly needed. The enquiry should encompass household food security, food diversity (as indicator of nutritional quality), eating practices and underlying influences and physical activity. These tools need to be developed and validated in different settings in connection with school-based or health centre-based intervention programmes rather than as free-standing research, for higher relevance. Participatory approaches are particularly well suited for research work with undergraduates.

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