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Assessment of Protein-Energy Intake and Health Status of Secondary School Students in Kaduna Metropolis, Nigeria

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Abstract

This study investigated the protein-energy intake and health status of secondary school students in both public and private schools in Kaduna metropolis. The study used a survey research design to randomly select 100 students from five public and five private schools, 10 from each school, in the study area. Purposely selected students of JS 1 and JS2 classes (ages 10 to 20 years) were administered with structured questionnaires to collate their bio-data and 24-hours dietary recall while their anthropometric data were also measured. Data collected were computed as means, frequencies and percentages. Anthropometric data were analyzed using Z score deviation and the body mass index (BMI) analyzed using Pearson correlation coefficient. Results showed that 95% of all the students attended school regularly. The BMI of the students showed that 18 and 9% of students in both private and public schools were severely underweight. However, 16% in private schools and 10% in public schools had normal weight. Only 5% of the students were obese; 3% in private schools and 2% in public schools. Most male students in private schools and all the students in public schools had inadequate energy intake. More than 75% of all the students in the private schools had inadequate energy intake whereas more than 66% of all the students in public school had adequate protein intake. Type of school (private or public) did not affect students' rate of school attendance. However, there was significant positive correlation between energy intake and nutritional status. The result showed that the students were mostly inadequately fed and of poor health status.

Key words: Protein-energy intake, health status, students, Kaduna metropolis.

Introduction

The right to adequate standard of living, including food, is recognized in the universal declaration of human right (Eide, 1987, Olarinde and Kuponiyi, 2004). Under ideal situation, all people at all time should have physical and economic access to sufficient amount of food to meet their dietary needs for production and healthy living. However, economic deregulation in Nigeria in recent time has brought about reduction in household income levels which in turn have drastically affected the livelihood and nutrition adequacy of most Nigerian families. Common staples in most Nigerian homes are insufficient and do not provide balanced diet, and as a result, malnutrition emanating from under-nutrition is prevalent in many homes (Konnawa, 1999; Abdulahi,

1999). Unsatisfactory feeding has been shown to be very common in many developing countries (WHO, 2000). Protein-energy malnutrition constitutes the major nutritional problem of many adolescents, and this impairs their growth, health, mental capability and productivity (Bertman and Kawachi, 2000; Ivonovic *et al.*, 2002; Ishara, 2005). Millions of people are affected by inadequate food intake. Malnutrition among adolescents has been reported as an impediment to learning participation in school activities and academic achievement. Malnutrition impedes learning ability. It results in low mental capability, stunted growth and persistent ill-health (Braveman and Gruskin, 2003).

Apart from socio-economic factors, physical and psychological pressures influence the adolescents' eating habits. The height and weight that a child attains is affected by life styles, genetic and environmental factors; but when adequately nourished most children follow standard patterns of growth. Under nutrition and thinness in adolescents are estimated by stunting (low height for age), under-weight (low weight for age) or wasting (low weight for height) following different internationally and regionally recommended standards (WHO, 2005). In some situations, under nutrition is often mild that physical symptoms are absent, and blood tests do not usually show the slight metabolic changes. However, even in the absence of clinical symptoms, undernourishment may affect reproductive capability, resistance to and recovery from diseases, physical activity and work output, attitudes and behaviours (Wardlaw, 1998; 1999). A normal growth pattern is the best indicator of adequate nourishment and good nutritional status (UNICEF, 2001; Smolin and Grosvenor, 2003). The growth pattern of adolescent boys and girls can be extrapolated from a number of anthropometric data such as weight and height of an individual expressed as body mass index (BMI). Body mass Index (BMI) is the most appropriate parameter for determining nutritional status of adolescents in developing countries like Nigeria (WHO, 2000; Mulchopadhyay, 2004).

Health and nutrition have been proven to have close links with overall educational success (Behman, 1996). Improving the awareness of nutritious meal choices and establishing long-term habits of healthy eating has a positive effect on cognitive and spatial memory capacity, potentially increasing students' ability to process and retain academic information. In school going ages of children and adolescents, deficiencies of protein and energy in diets result in underweight, wasting, stunted growth, low immunity, impaired cognitive and motor development, and learning. Garnder and Dolein (2002) reported that well nourished children performed significantly better in school. Thus, data on health and nutritional status of students are needed for effective nutrition programme planning and implementation to monitor and evaluate academic goals for national development. There is no existing document on nutritional and health status of secondary school students in most Nigerian schools. The

problem of this study therefore was to investigate the nutritional status and protein-energy intake in relation to some socio-economic factors of secondary school students of Kaduna metropolis, Kaduna state Nigeria.

Purpose of the Study

The main purpose of the study was to investigate the nutritional status, energy and protein intake of students of private and public secondary schools in Kaduna metropolis while the specific objectives were to:

1. Investigate the prevalence of underweight, overweight and obesity among these secondary school students of Kaduna metropolis,
2. Investigate the effect of malnutrition on the students' school attendance, and
3. Investigate the level of energy and protein intake of the students.

Research Questions

1. Were there incidences of underweight, overweight and obesity among secondary school students of Kaduna metropolis?
2. What were the levels of students' attendance to schools in both private and public schools?
3. What were the levels of energy and protein intake of students in both private and public schools?

Hypothesis

One null hypothesis was tested at 0.05 level of significance of the study.

Ho: There was significant correlation between energy intake and protein intake and nutritional status of both private and public schools in Kaduna metropolis

Significance of the Study

The study will be beneficial to Kaduna State, Nigerian Government and world organizations such as UNICEF in promulgating and sponsoring pragmatic food and feeding policies towards improving the well-being of students.

Methodology

This study employed a survey research design. The area of study was Kaduna metropolis of Kaduna state in the Northern Nigeria.

Population for the study

The population of the study was made up of all students in boarding and day public and private secondary schools in Kaduna metropolis, Kaduna State, Nigeria. For the purpose of this research work, the researcher proposed 100 students. Five public schools and five private schools were used. Five students each from the schools between the ages of 10 - 20 years were used as respondents.

Sample for the study

Stratified and purposive random sampling techniques were employed to determine the sample for the study during the 2011/2012 academic session. Ten out of -secondary schools in the study area were randomly selected for questionnaire administration and anthropometric measurements. Of the ten schools, five were private schools while the remaining five were public schools. Ten students within 10-20 years of age and in JSS 1-2 were randomly selected from each of the ten secondary schools.

Instrument for data collection

Structured questionnaire was designed to generate information on the respondents' bio data, 24-hours dietary recall and anthropometric. The questionnaire was validated by two experts. A pilot test of the questionnaire on 20 students that did not form part of the sample was conducted to determine its reliability.

Data collection technique

The researcher, with the help of two research assistants, administered 100 questionnaires, one on one to the students, took anthropometric (waist and hip) measurements on each student and then interviewed them on the 24-hours dietary recall. The questionnaire served as interview schedule to the respondents. The researcher explained the questionnaire items to the respondents who recorded their responses thereafter.

The food composition Table of commonly eaten foods in Nigeria by Oguntona and Akinyele (1995) was applied to the data collected from the 24-hour dietary recall to calculate the total energy and protein intake by the students, using the formulae:

$$\text{Energy intake} = \frac{\text{Observed intake (from field)}}{\text{Recommended Daily Allowance}} \times 100$$

$$\text{Protein intake} = \frac{\text{Observed intake (from field)}}{\text{Recommended Daily Allowance}} \times 100$$

The Z score deviations for weight and heights of the World Health Organization (WHO) child growth standards (2005) was applied to the anthropometric data to calculate the Body Mass Index (BMI) as an indicator of underweight, overweight and obesity among the students, using the formula:

$$\text{Body Mass Index (BMI)} = \frac{\text{Observed weight (Kg.)}}{\text{Observed height (m}^2\text{)}} \times 100$$

Where, BMI < 18.50 indicates underweight,
18.50 ≤ BMI ≤ 24.99 indicates normal weight,
25.00 ≤ BMI ≤ 29.99 indicates overweight, and
BMI ≥ 30 indicates obese (Ref?)

Statistical analysis

SPSS computer software was used to analyze data generated from the survey. Data collated were analyzed using means, standard deviations, percentages and frequency distributions. T-test was used to establish significant differences between BMI values among students in public and private schools. Correlation coefficient (r^2) was used to establish significant differences in nutritional status of male and female students in both public and private schools in the study area.

Results and Discussion

The rate of students' attendance to school in the study area during the session was evaluated for both the private and public schools, and the result is shown in Table 1 below. Not more than 10% of student population of both the private and public schools had poor attendance during the session. Only very few students stay out of school for some days. About 90% or more of the entire students in both private and public schools had good attendance to schools. Thus, being a private or public school has no effect on students' attendance to school in Kaduna metropolis. This implies that at least about 90% of all the students in Kaduna metropolis were always regular in schools during the session. Shortage of food is one of the major drawbacks to students' regularity and punctuality to schools in Nigeria, just as in many other developing countries. Lack of food, is ruled out as the cause of absenteeism by the very few students to school in Kaduna metropolis. Otherwise, there could have been sharp differences in students' attendance between private and public schools. However, students may be regular in schools and yet not involving actively in most school activities. This could occur as a result of differences schools' administrative and academic activities, as is always the case with public and private school.

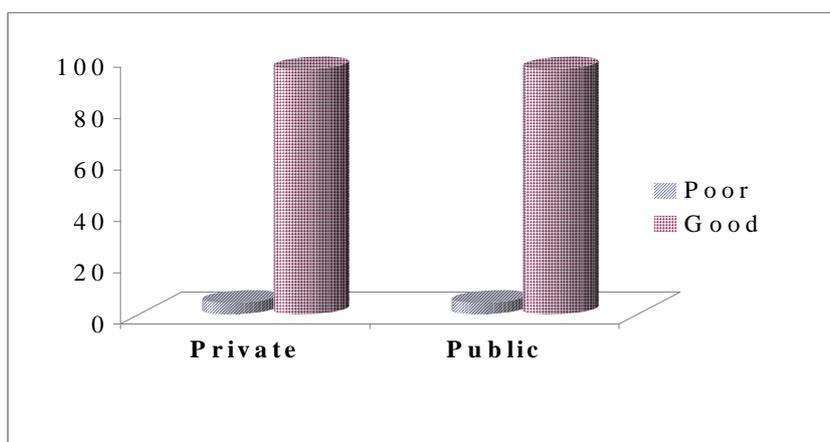


Fig 1: Students' rate of attendance (%) to (public and private) school during the session

Figure 2 shows the distribution of body mass index (BMI) of students in the public and private school of Kaduna state metropolis. Body mass index (BMI) is one of the most appropriate parameters for determining nutritional status among adolescents (WHO, 2000). Of all the students in Kaduna metropolis, 18% of those in public schools and 9% of those in private schools were severely underweight while 6% of those in public schools and 11% of those in private schools were moderately underweight. Also, 14% of those in public schools and 11% of those in private schools were mildly underweight. The severely and mildly underweight situations of these students suggested inadequate feeding which could be as a result of non availability or inappropriate selection and combination of the right food staples for menu. Their food habits need investigation for appropriate orientation and counseling. Worst still, 2% of those in public schools and 3% of those in private schools were evidently mildly obese. This obese group may have been consuming diets with high contents of energy giving foods or may be from genetically obese lineage. Their case is considered more serious than the earlier groups. They are more likely to suffering cases of heart and coronary diseases in their life time. However, 10% of those in public schools and 16% of those in private schools had normal weight for height. This last group is very few and could be considered healthy and having adequate nutrition.

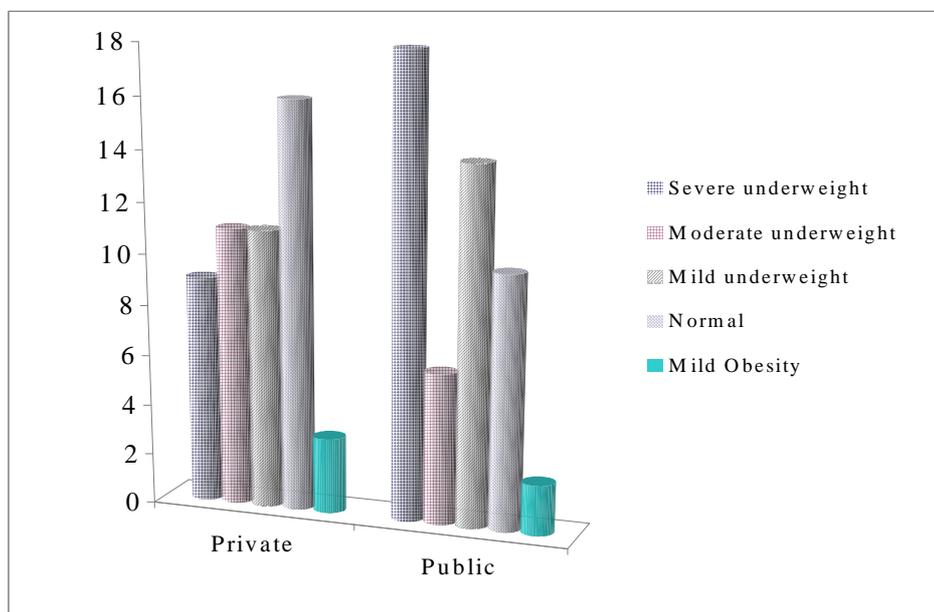


Fig 2: Level of obesity among students in private and public schools.

Table 1 shows the level of adequacy of protein and energy intake among the students. In the private schools, both the female and male students had grossly inadequate protein intake. More than 75% of them were feeding with inadequate intake. The situation was worse with energy intake in the same private schools. All the female students and about 78% of the male students were having inadequate energy intake. This implies that the students in private school were grossly inadequately fed with poor nutrient food materials. Thus, they were fed with inadequate, poor food.

The case was slightly different with students in the public schools. About 67 to 80% of the students' population had adequate protein intake, as shown in Table 1. However, their energy intake was grossly inadequate. . About 90% or more of the students' population were having inadequate energy intake.

Table 1: Level of adequacy in Protein and energy intake among students

	Type of school	Sex	Level of intake	Protein		Energy	
				Frequency	Percent	Frequency	Percent
1.	Private	Male	Inadequate	32	77.8	32	77.8
			Adequate	9	22.2	9	22.2
			Total	41	100	41	100
		Female	Inadequate	7	75.0	9	100
			Adequate	2	25.0	0	0
			Total	9	100	9	100
2.	Public	Male	Inadequate	9	33.3	25	91.9
			Adequate	18	66.7	2	8.3
			Total	27	100	27	100
		Female	Inadequate	5	20.0	20	89.9
			Adequate	18	80.0	3	10.10
			Total	23	100	23	100
Total				100	100	100	100

Using a Pearson correlation co-efficient (Table 2), energy and protein intake, rate of school attendance and economic status of the students were correlated with nutritional status of the students in the private and public schools. In the private schools, nutritional status positively correlated with energy and protein intake at 46.7 and 14.1% respectively, while rate of attendance was 15%. Economic status of the students' income was negatively correlated with their nutritional status at 20.8%. This could be attributed to the family's poor nutritional knowledge to get the best from their resources. Among the public school students; energy intake was negatively correlated at 41%, while protein intake was low at 0.7%. The rate of school attendance of students negatively correlated to their economic status. This implied that students of poor economic status were prone to high rate of attendance to schools, and vice versa. The

reason for these anomalies is not reported in the findings, but it could be attributed to these students being actively in household and economic activities of the families and otherwise to amass wealth.

Conclusion

This study showed that energy and protein intake by the students were inadequate to adequately support their health status otherwise majority of them would not have been underweight or slightly obese. Both students from private and public schools were equally affected nutritionally but it does not significantly affect their punctuality at school. Their food intakes need to be improved upon to enhance their academic performance .and other activities.

Table2: Correlation of nutritional status to some socio-economic variables of respondents.

Type of school		Nutritional Status	
Private	Energy Intake (Kcal)	Pearson correlation. 467(*) sig (2-tailed)	.028
	Protein intake (Gram)	Pearson correlation. 141 sig (2-tailed)	.530
	Rate o attendance (%)	Pearson correlation. 150 sig (2-tailed)	.506
	Economic Status	Pearson correlation -. 208 sig (2-tailed)	.207
	Nutritional Status	Pearson correlation 1 sig (2-tailed)	.855
Public	Energy Intake (Kcal)	Pearson correlation. -.041 sig (2-tailed)	.977
	Protein intake (Gram)	Pearson correlation. 007 sig (2-tailed)	.357
	Rate of attendance (%)	Pearson correlation -.206 sig (2-tailed)	.310
	Economic Status	Pearson correlation -.277 sig (2-tailed)	
	Nutritional Status	Pearson correlation 1 sig (2-tailed)	

- Correlation is significant at 0.005 level (2-tail).

References

- Abdulahi, A (1999). Food Policy and Food Security in Nigeria; In: P. Konnawa and E. Aiydun (eds), *Food Demand and Market Studies in the Drier Savanna of Nigeria*. Proceedings of a Methodology and Stakeholders Workshop, 7th – 8th September, 1999, Kaduna, Nigeria.
- Bertman, L and Kawachi, L (eds.) (2000). *Social Epidemiology*. Oxford University Press, New York, 128 pp.
- Eide, A (1987). Food as a Human Right, Tokyo, United Nation's University. Food and Agriculture organization (FAO) 1989 Committee on World Food Security, Food Security Assistance Programme, Rome Italy, United Nations.
- Garnder, A. and Dolein, C. (2002). The health and nutritional status of school children in Africa: Evidence from School Health Programme in Ghana and Tanzania. *SCN NEWS*.
- Ischara, N. (2005). Material employment and income effect on dietary calorie adequacy in house hold in Sri-Lanka. *Food and Nutrition Bulletin* 26, (222): 13 – 229.
- Ivanovic, D. M, Boris, M., Leiva Heman, P, Pore Nehda T. Atito, B; Lmagia Triana D, Toro, M, Umutia, S. Cavilia, J. and Bosch, E (2002). Nutritional status, brain development and scholastic achievement of children of high school graduate from high and low intellectual quotient and socio-economic status. *British Journal of Nutrition*, 87: 81 – 82.
- Konnawa, P.M. (1999). Food demand structure and market studies for IITA mandate, crops: An interview in: P. konnawa and E, Aiyehn (eds). *Food Demand and Market Studies in the Drier savanna of nigeira*. Processdings of Methodological and Stakeholders Workshop, Kaduna, Nigeria.
- Lawrence, H and Sullivan, Eileen-Kennedy Joan (1994). Choice in Indicator for Food Security and Nutrition monitoring. *Food Policy*, 19 (3): 329-343.
- Oguntona, E. B. and I. O. Akinyele, 1995. Nutrient Composition of Commonly Eaten Foods in Nigeria-Raw Processed and Prepared. *Food Basket Foundation*, Ibadan, Nigeria, pp: 6-56.
- Olarinde, L. O. and Kuponiya, F. A. (2004). Rural Livelihood and Food Consumption Patterns among Households in Oyo State, Nigeria: Implications for Food Security and Poverty Eradication in a Deregulated Economy. *Journal of Social Science*, 11 (2): 127-132.
- Smolin, A.L. and Grosvenor, B. (2003). *Nutrition Science and Application*, 4th edition. John Wiles & Sons Inc. Denver Massachusetts, USA, pp. 429-431.
- UNICEF (2001). Children and Women in Nigeria: situation, Assessment and Analysis. National Population Commission and United Nation International Children Education Fund, Abuja, pp. 127-132.

- Wardlaw, G. (1998). *Contemporary Nutrition Issues and Insights*, 4th edn. McGraw Hill Companies, U.S.A.
- Wardlaw, G. (1999). *Perspective in Nutrition*, 4th edn. McGraw Hill companies, U.S.A.
- World Health Organisation (2000). Nutrition for health and development. Document WHO/NHD/006. Genera: WHO.
- World Health Organization (2005): Make Everybody Mother and Child Count. The World Health Report, 2005.