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Nutritional Information and Food Consumption Pattern of Adolescents' Secondary School Students in the Urban-Slum Communities of Ibadan, Oyo State, Nigeria

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Nutritional status is influenced by the food consumed, health status, sanitary environment and accessibility to nutritional information. This study explored nutritional information and food consumption pattern of adolescents' secondary school in urban slums, using students in public secondary schools in Ibadan North Local Government Area (IBNLGA), Oyo State, Nigeria. A descriptive study was conducted using a three stage random sampling technique to select 467 respondents. Data were collected using a semi-structured interviewer-administered questionnaire, anthropometric measurements, observational checklist, and Hellen Keller International food frequency questionnaire. Data were analyzed using descriptive statistics, Chi-square and logistic regression statistics. Results revealed among others that respondents' favourite foods were

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cassava-based, and sources of nutrition information included teachers (41.8%), parents (33.8%), television (22.1%), radio (16.7%) and siblings (1.3%). The study concluded that many respondents were underweight partly due to poor food consumption pattern as a result of inadequate access to nutritional information. This study recommended more intensive approach to address health and nutrition issues by providing adequate nutritional information in this age group.

Keywords: Nutritional status; nutritional information; food consumption pattern; urban-rural slum; adolescents; health status.

1. INTRODUCTION

Good nutrition is an essential pre-condition for health and well-being and for realisation of a person full potential. This applies to adolescents, just as it does for other age groups. Healthy eating pattern promotes optimal health, growth and intellectual development and prevents diseases, while poor dietary eating choices may cause malnutrition [1]. Improving nutrition therefore presents a key opportunity to improve health.

In Nigeria, the starting school age for primary education is six years while the normal age for starting secondary school education is twelve years. By age fifteen, a secondary school child is expected to be in the senior secondary school (SSS). Adolescents are vulnerable to nutrition-related problems, including malnutrition, micronutrient-malnutrition, obesity and other nutrition-related malnutrition. The age distribution of the respondents (10 to 19 years) thus reflects the normal secondary school (JSS and SSS) age range in Nigeria. The duration of JSS programme is three years and this is usually followed by another three years of senior secondary school education (Federal Ministry of Education, 2006). Also, the age range (10 to 19 years) of the respondents represents the WHO 1989 specified and standard age for the age group called the adolescents (WHO, 1989). However, an adolescent was defined as a person between aged 12 to 19 years (The International Development Research Centre, 1985).

According to WHO [2] fact sheet on adolescents' dietary habit, eating a balanced and varied diet and establishing healthy eating habits promotes young people's health, growth and intellectual development across the life-course. Most notably, a healthy diet and body weight reduces the risk of ill health and premature death from non-communicable diseases (NCDs). Some diet-related behaviours are particularly important during adolescence. According to WHO [2], healthy eating behaviours become less common as young people move through adolescence, with the frequency of breakfast consumption, eating fruit and having evening meals with the family decreasing between ages 11 and 15.

In essence, adequate and proper nutrition is an important aspect of a healthy lifestyle [3,4], and poor eating behaviours and nutrition knowledge deficits may harmfully affect health and increase healthcare costs. The developmental transition (physical, psychological and social) during adolescence provides a context for development and perpetuation of eating behaviours that are substantially different from those in other phases of life [5].

Like any other health related subject (reproduction, people living with HIV/AIDS, genital mutilation etc.); sources of nutrition information is based on Information, education and communication (IEC) programmes. Information, education and communication combine strategies, approaches and methods that enable individuals, families, groups, organisations and communities to play active roles in achieving, protecting and sustaining their own health. Embodied in IEC is the process of learning that empowers people to make decisions, modify behaviours and change social conditions. The IEC materials play a significant role by positively shaping adolescents' and the general public knowledge, perception and attitude on a variety of important issues on nutrition, both through the information that is dispensed through them and through the interpretations and emphasis they place on this information.

Nutritional information can be communicated through many channels to increase awareness and assess the knowledge of different populations about various issues, products and behaviours. Channels might include interpersonal communication (such as individual discussions, counselling sessions or group discussions, community meetings and events, parents, teachers, father/mother, siblings, fellow

students) or mass media communication (such as radio, television and other forms of one-way communication, such as brochures, leaflets and posters, visual and audio visual presentations and some forms of electronic communication [6].

Most studies conducted among adolescents in Nigeria concentrated on anti-social vices including drug abuse and unhealthy reproductive behaviours, thus, leaving their nutritional status and nutrition information accessibility and use inadequately explored. Nutritional status is influenced by the food consumed, health status, sanitary environment and adequate use of nutrition information. Helping adolescents to develop skills that include constructive behaviours and use of nutrition information is a way of opening this window and helping them build better futures with more education, job skills and with more confidence and life skills to withstand negative events in their lives [7]. Information is defined as a message received and understood while nutritional information is the nutritional information received and understood. Sources of the nutritional information to the adolescents include: the internet, television, radio, newspapers, magazines, posters, billboards, jingles and the organizations which control these technologies (Potter, 2008).

The WHO European food and nutrition action plan for 2015–2020 steps to reduce the negative impacts of unhealthy diets and obesity in young people among other specific actions which include adopting easy-to-understand nutritional information about food products, particularly those targeted at children and adolescents [2]. Studies revealed that there is a relationship between nutrition knowledge and attitude [8,9], which indicated that nutrition knowledge gained from nutrition information and attitudes are significant and positively correlated; that is, the more the knowledge about nutrition the greater the positive attitude towards it [10].

This study was therefore, designed to explore nutritional information sources, accessibility, and use as it influences food consumption pattern, eating and snacking behaviour of the adolescents secondary school students in Ibadan, Oyo State, Nigeria. In essence, the availability, accessibility and willingness of the adolescents to read Information, Educational and Communication materials (IEC) on nutrition will go a long way to address malnutrition in this group of people. Their knowledge in the epidemiology of malnutrition will be widened and this will assist them to know more about the dos and don'ts of the aetiology of malnutrition.

The study site was Ibadan North Local Government Area, which is made up of 12 wards. Each of these wards is made up of communities and areas with total no of 54. The wards had all the features of areas classified or called urban-slums, for example, in these wards; people's ability to modify their living conditions is minimal because they do not have the resources to do so. Houses were built of mud and few with moulded mud or fabricated cement blocks. Broken down and/or dilapidated houses and schools are common features in all these areas (http://thaso2.wordpress.com/2009/03/26/nothing-carries-over/). All these features such as unplanned area, overcrowding, poor sanitary environment/facilities, lack of drainage and low socio-economic status of the inhabitants qualified these wards to be called slums.

2. LITERATURE REVIEW

According to Swinburn and Egger [11], after the age of 12 years, adolescents seldom conform to a regular pattern of three meals a day, with over 50% of them admitting that they eat at least five times a day. Snacks were defined as *foods and drinks eaten between meals including milk drinks, regular soft drinks, sports drinks and energy drinks, and.* snacking is likely to play an important role in the development of overweight and obesity [12]. Behaviours are usually affected by many factors including the most urgent needs of the target population and the risks people perceive in continuing their current behaviours or in changing to different behaviours [6].

Wahba, Arrafa, Saleh, Mekkawy and Ahmed [13] conducted a quantitative survey to explore knowledge and attitudes toward functional foods among adults working in the national research center, Egypt and the results indicated that 90. 9% of respondents believe that food and nutrition play a great role in maintaining or improving overall health. Furthermore, in the study of Wahba et al. [13], on adults' knowledge and attitudes toward functional foods, more than 85% believe in the health benefits of certain foods. 89. 3% are interested to know more about functional foods. Cereals was the most common food group named by the respondents (48. 5%) followed by fruits & vegetables (18. 7%). Also, scientific magazines were the main source of their knowledge. Older age group and highly educated

ones are more positive about functional foods than others.

A study by Onyiriuka , Umoru and Ibeawuchi [14] revealed a relatively high rate of consumption of fast food by adolescent urban Nigerian schoolgirls. One feature of fast-food consumption in their study that needs to be highlighted is that over three-quarters (76.0%) of the girls in Nigeria consumed fast food along with soft drinks. A similar finding was reported in a study of adolescent schoolgirls in Iran [15]. This is also not surprising, as it is consistent with studies of adolescents in Saudi Arabia and Iran [16,15], and it is a worrying finding because in Nigeria, two-thirds (68.9%) of the fast food consumed by the girls [14] revealed energy-dense food such as meat pies, egg buns, cake and doughnuts; the combination of such food with soft drinks, which have a high glycaemic index and are also energy dense, is a very unhealthy eating habit. In this context, unhealthy eating behaviour is therefore a serious health issue and should be addressed.

Snacking is also commonly associated with undesirable health outcomes and dietary patterns. Since children and adolescents select snacks based on taste over nutrition, they more often choose salty, crunchy foods as snacks over healthier alternatives [17]. Consequently, snacking is commonly regarded as a contributing factor in the development of childhood overweight and obesity, although studies that have examined the association between snacking and body mass index have yielded mixed results [18,19,20,21]. Snacking may also be associated with less frequent consumption of meals, which may be detrimental to health since regular meal patterns are associated with greater dietary diversity [2], healthier food choices [23] and better nutrient intakes [24,25].

A study by Essien, Emebu, Iseh and Haruna [26] showed that secondary students in Nigeria were deficient in knowledge and understanding of the facts about energy and nutritive values of foods. In the same vein, the changeover from high school to university is characterized by the inability to make informed food choices and unhealthy eating habits and the unhealthy eating habits exhibited by university students in is worrying [27]. Therefore, adequate nutrition information is needed at the secondary school level; this will enable the students to make good food choices and positively influence their eating habits thereby ensuring better nutritional status. Similarly, because behavioural issues are often the key to good health and adolescence is a key period in which much behaviour are formed. This period can be viewed as a window of opportunity.

2.1 Statement of the Problem

Malnutrition in adolescents leads to economic losses for families, communities, and countries because malnutrition reduces adolescents' ability to work and can create ripple effects that stretch through generations. In the urban-slum communities in IBNLGA schools, preliminary investigations showed that schools are confronted with challenges of poor environment which may contribute negatively to their nutritional status. The environment is characterised by congestion/overcrowding, poor sanitation, lack of access roads, poor refuse disposing facilities and good drainage system. Therefore, poor sanitation and food contamination cannot be ruled out. Health services are either not in existence, not accessible or unaffordable. People living in the area looked poor and engaged in menial jobs and petty trading. Good nutrition is needed to tackle future adolescent health related problems; strengthen the learning potential of adolescents to enable them learn effectively and maximize investments in education, hence, the need for the study among the target group in the locality. Good nutritional status and sources of information on adolescents in the study area will contribute to strengthening their learning potential and well-being. Good health and nutrition information sources are needed to achieve one's full educational potential because nutrition affects intellectual development and learning ability. However, Data on adolescent nutritional status and sources of nutritional information in developing countries, including Nigeria are scarce, hence, it is imperative to investigate nutritional information and food consumption pattern of adolescents' secondary school in urban slums, in public secondary schools in Ibadan North Local Government Area (IBNLGA), Oyo State, Nigeria.

2.2 Purpose of the Study

The purpose of this study was to explore nutritional information sources, accessibility, and use as it influences food consumption pattern, eating and snacking behaviour of the adolescents secondary school girls in urban-slum area of Ibadan, Oyo State, Nigeria. Specifically, the study aimed to:

i. find out the socio demographic characteristics of the adolescents secondary school girls in urban-slum of Ibadan, Oyo State, Nigeria
ii. investigate factors influencing respondents' food consumption pattern
iii. identify sources of nutritional information available to the respondents in their various schools
iv. determine the level of nutritional information accessibility (preferred medium) among the respondents
v. establish the relationship between the perceived health consequences of the food that the respondents consume and nutritional status
vi. establish the relationship between the respondents' sources of nutritional information and their nutritional status
vii. examine the influence of nutritional information use on foods eaten by the respondents

2.3 Hypotheses

$H_0$1 There will be no significant relationship between the perceived health consequences of the food that the respondents consume and nutritional status

$H_0$2 There will be no significant difference between the respondents' sources of nutritional information and nutritional status

2.4 Study Population

The study population consisted of co-educational institutions of junior and senior public schools adolescent students in the locality that comprised wards 2, 3 and 4 in the urban- slum areas of Ibadan North Local Government Area (IBNLGA), Oyo state, Nigeria. The students' population figure of 2,100 from the six schools was obtained from Ministry of Education and the school Principals as at the time of this study.

3. METHODS

A descriptive survey study was conducted using a three stage random sampling technique and, Kneiss [28] sample size calculation was used to select 467 respondents from a population of 2,100 in all the six public secondary schools located in four of the 12 wards in the urban-slum communities that met the criteria for urban slum description in Ibadan North Local Government Area (IBNLGA), Oyo State, Nigeria. A proportionate sampling procedure was conducted to determine the number of students that were selected from each school. Schools were stratified on class basis e.g. into; senior classes and, junior classes. Classrooms were chosen on a systematic random basis and each adolescent was selected randomly from a classroom. The criteria used were age and the health status of the adolescents. Individuals who were either less than 10 or more than 19 years were excluded. Efforts were made to ensure that there was equitable representation of the respondents by sex. The survey instrument which is a structured questionnaire was conducted on 500 students from various schools of these, 467 were included for analysis; 33 were excluded because of incomplete survey. Data were analysed using descriptive statistics, Chi-square and logistic regression statistics. Correlation analysis was done to test the relationship of some demographic characteristics of the respondents at $p<0.05$ value for significance.

4. RESULTS

Socio demographic characteristics of the respondents.

Table 1 shows the socio-demographic characteristics of the respondents. The age of the respondents ranged from 10-19 years with a mean of 15.5 ±1.8 years. Among the 467 respondents more than half, 290 (62.1%), were in the 10-14 years age range while 177 (37.9%) were in the 15-19 years age range. The study sample consists of 207 (44.3%) males and 260 (55.7%) females spread across the three classes of junior secondary school and two classes of only one senior secondary school assessed.

The population of the junior secondary school students in the study was 398 (85.2%), while that of the senior secondary school was 69 (14.8%). Majority (56.1%) of the respondents were Muslims while (43.9%) were Christians. Most of the respondents (93.1%) lived with their parents while many parents, 82.2%, (father 32.5%; mothers 49.7%) were into private business. The number of children in a household determines its size and food security, it was discovered that 272 (58.2%), had more than four children and 195 (41.8%), had just four. 453 (97.0%), got their needs from their parents while (41.1%), engaged themselves in commercial activities after school hours and 275 (58.9%), did

not. Highlighted are those socio-demographic variables that may influence adolescents' nutritional status (See Table 1).

4.1 Food Consumption Pattern of the Respondents

Table 2 shows food consumption pattern of the respondents. Majority, 154 (33.0%) reported that they ate once away from home. However, a few respondents, 113 (24.2%), reported that they do not eat away from home. Others, 101 (21.6%), indicated that they ate twice away from home. A few, 13 (2.8%), indicated that they usually eat four times on the average away from home (See Table 2). The types of food sold at the food joints were staple 462 (98.9%), pastry 139 (29.1%), snacks 130 (27.8%), fruits 59 (12.6%) and milk 3 (0.6%) (See Table 2). The frequency of their visits to the food joints, majority, 267 (57.2%), indicated that they occasionally patronise the joints while a few, 130 (27.8%), reported that they regularly go to the joints to eat (See Table 2).

Table 1. The Socio- demographic characteristics of respondents

N =467

	Frequency	**%**
Age		
10-14 years	290	62.1
15-19 years	177	37.9
Sex		
Male	207	44.3
Female	260	55.7
Class		
JSS I	133	28.5
JSS II	137	29.3
JSS III	128	27.4
SS I	35	7.5
SS II	34	7.3
SS III	Nil	Nil
Ethnic group		
Yoruba	439	94.0
Igbo	17	3.6
Hausa	4	0.9
Idoma	4	0.9
Urhobo	1	0.2
Ebira	2	0.4
Religion		
Christianity	205	43.9
Islam	262	56.1
Are your parents still living together?		
Yes	406	86.9
No	61	13.1

Table 2. Frequencies of numbers of times respondents eat away from home

Table 2 Average number of times food is eaten away from home daily	**Frequency**	**N = 467 %**
1	154	33.0
2	101	21.6
3	50	10.7
4	13	2.8
5	36	7.7
None	113	24.2

Table 3. Respondents' favourite foods

Type of food	Frequency	%
**Rice based	287	61.4
**Leguminous based	203	43.4
**Cassava based	301	64.4
Vegetables/Fruits	156	33.4
Meat/Fish	185	39.6
Beverages/Milk/Eggs	51	10.9
** Yam based	143	30.6
Others e.g. bread	123	26.3

*** Multiple responses*

A majority (64.4%) of the respondents listed the cassava based foods as their favourite foods; followed by rice based foods, as mentioned by (61.4%) respondents. The least mentioned by 51(10.9%) respondents was beverages/milk/eggs (See Table 4).

4.2 Factors Influencing Respondents' Food Consumption Pattern

Majority (57.6%) of the respondents were of the opinion that their choices of foods give them energy. Similarly, 177(38.0%), stated that they preferred their choice of foods because it is fast to cook while the least reason given by 1(0.2%) respondent was because it was a traditional food (Table 2).

Many (90.0%) of the respondents said "yes" when asked whether they always have regular daily meal intake of breakfast, lunch and dinner. A large majority, 350 (75.0%) respondents reported that their favourite foods are always available to eat (Fig. 1). A large majority, 401 (86.0%) respondents, also indicated that their favourable foods are affordable.

Table 4. Reasons for the choice of food as the favourite food by the respondents

Reasons Given	Frequency	%
Supports growth	33	7.1
Is a balanced food	3	0.6
Is proteinous	72	15.4
**Supplies energy	269	57.6
Is our traditional food	1	0.2
Makes the body healthy	8	1.7
Contains nutrients	3	0.6

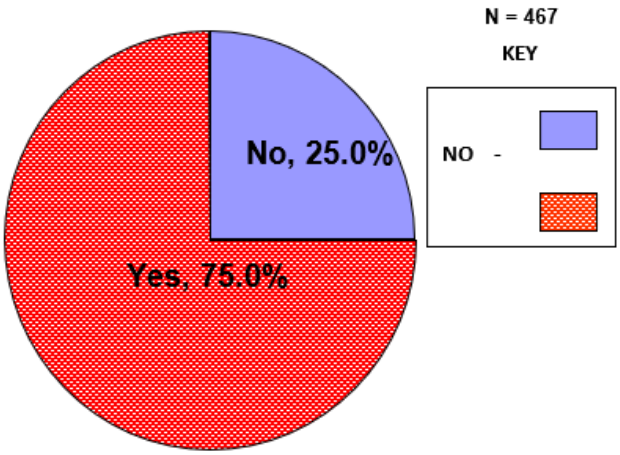

Fig. 1. Food availability to the respondents

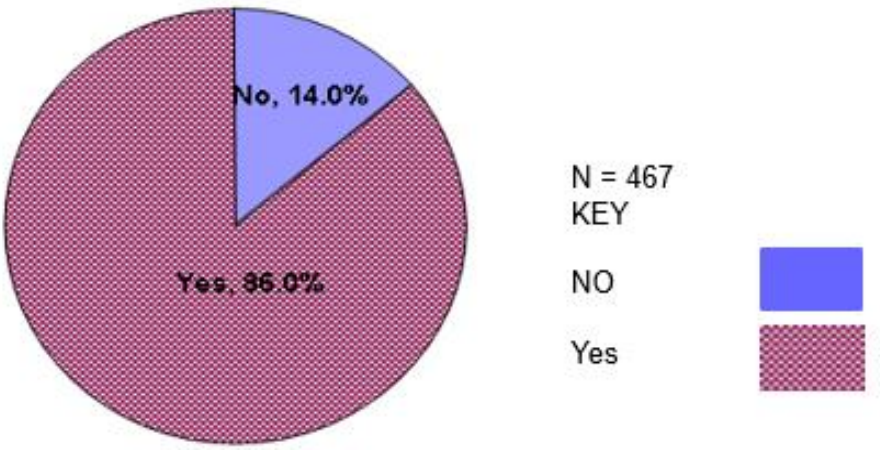

Fig. 2. Respondents' favourite food that are always available at home

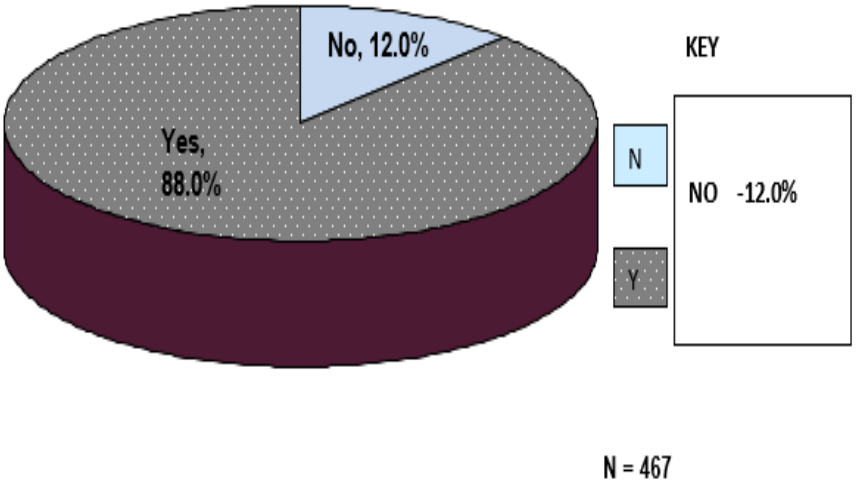

Fig. 3. Respondents' accessibility to food

Fig. 3 shows that an overwhelming majority, 409 (88.0%), had access to foods, while 58 (12.0%) did not have access to foods. More than half of the respondents, 278 (60.0%), reported that certain foods are not eaten because of tradition or belief. Top on the list of the food items mentioned by the respondents were staple foods e.g. fufu, amala, rice, gari, 242 (52.0%) followed by meat, 237 (50.7%) while pastry, snacks and beverages (2, 0.4%; 1, 0.2% and 1, 0.2% respectively) were the least mentioned (See Table 5).

More than half 276 (59.0%) take milk due to the information received on them, followed by eggs, 123 (26.3%). The least mentioned were Artificial juice and staple foods e.g. fufu. amala and yam (2, 0.4%; 2, 0.4%) respectively (See Table 6).

Table 9 shows that many of the respondents required nutritional information for health living (52.0%), while some (39.0%) needed information for good eating behaviour, but very few required nutritional information for oral hygiene and healthy foods (23.3%, 9.0%) respectively.

4.3 Respondents' Sources of Nutrition Information

Table 6 shows respondents' sources of nutrition information. Many of the respondents indicated

school teachers, 205 (43.9%), as their major sources of nutrition information; this was closely followed by parents, 178 (38.1%), Television (33.8%) and Radio (16.7%), as the source of nutrition information; medical personnel, 1 (0.2%), was the least mentioned source of nutrition information. An overwhelming majority, 452 (97%), respondents reported that they benefited from the sources that provided them nutrition information.

More than half 242 (52.0%), of the respondents opined that they need nutrition information on healthy foods, good eating behaviour recorded 180 (39.0%), information on oral hygiene was mentioned by 109 (23.3%), while malnutrition, 41 (9.0%), was the least mentioned area which information was needed on.

Sources of information in schools included teachers, 162 (34.7%) and this was followed by pictures/charts, 106 (22.7%). Fellow students and radio, 4 (0.9%); 3 (0.6%); were the least mentioned of such things that provide respondents nutritional information in their schools respectively (See Table 8).

4.4 Relationship between the Factors that Influence the Respondents' Food Consumption Pattern and Nutritional Status

The relationship between the factors that influence the respondents' food consumption pattern and nutritional status was not statistically significant p = 0.112 (See Table 9).

Among the factors that may influence the respondents' food consumption pattern are food availability and affordability; respondents' health status, tradition/belief, taste and the respondents' access to nutrition information. According to the respondents, majority (60%) said that there are certain foods that they did not eat because of tradition or belief (See Table 9).

Table 5. Types of foods eaten by the respondents because of the nutritional information received on them

Types of food	Frequency	%
Pastry	47	10.1
Snacks	44	9.4
Artificial juice	2	0.4
Staple foods e.g. maize, wheat, millet, rice, gari, amala, fufu e.t. c.	2	0.4
Vegetables	29	6.2
Meat	19	4.1
Fish	6	1.3
**Beverages	120	25.7
** Milk	276	59
** Eggs	123	26.3
Fats and oils	3	0.6

***Multiple responses*

Table 6. Respondents' sources of nutritional information

Sources of information	Frequency	%
**Teachers	205	43.9
Fellow students	11	2.0
Radio	78	16.7
**Television	158	33.8
** Parents	178	38.1
Siblings	6	1.3
Medical personnel	1	0.2

*** Multiple responses*

Table 7. The preferred medium of information by the respondents

Sources	Frequency	%
**Radio	117	25.1
Parents	40	8.6
Television & others	84	18.0
**At school by a teacher	208	44.5
**Mother or father	101	21.6
Siblings	5	1.1
At school by fellow students	3	0.6

***Multiple responses*

Table 8. Sources of nutrition information available to the respondents in their various schools

Sources	Frequency	%
**Teachers	162	34.7
During Home Economics lesson	28	8.8
Addresses during assemblies	9	1.9
Notice board	8	1.7
Counselling	2	0.4
**Pictures/Charts	106	22.7
Health talks/Seminars	7	1.5
Fellow students	4	0.9
Radio	3	0.6
Signboard/Billboard	19	4.1
Newspaper	4	0.9
**No structure	158	33.8

*** Multiple responses*

Table 9. Relationship between the perceived health consequences of the food that the respondents consume and nutritional status

N = 467

Variable	Nutritional Status of Respondents										Chi-square (X^2)	DF	P-value
Do you think the type of food you eat affects you in any way?	**Underweight**		**Healthy weight**		**At the risk of overweight**		**Overweight**		**Total**				
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)			
Yes	45	(56.3)	33	(41.3)	1	(1.3)	1	(1.3)	80	(100)			
No	224	(57.9)	160	(41.3)	2	(0.5)	1	(0.3)	387	(100)	2.108	3	0.550
Total	269	(57.6)	193	(41.3)	3	(0.6)	2	(0.4)	467	(100)			

Table 10. Relationship between the Respondents' sources of nutritional information and their nutritional status

Variable	Nutritional Status of Respondents										Chi-square (X^2)	DF	P-value
Respondents' sources of nutritional information	**Underweight**		**Healthy weight**		**At the risk of overweight**		**Overweight**		**Total**				
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)			
**At school by a teacher	32	(18.3)	143	(81.7)	0	(0)	0	(0)	175	(100)	29.423	18	0.043
**At school from fellow students	1	(11.1)	8	(4.6)	0	(0)	0	(0)	9	(100)			
**Radio	11	(16.7)	55	(83.3)	0	(0)	0	(0)	66	(100)			
**T.V. & others	27	(31.3)	58	(66.7)	0	(0)	2	(2.3)	87	(100)			
**Mother or father	38	(25.0)	92	(60.5)	19	(12.5)	3	(2.0)	152	(100)			
Siblings	1	(20.0)	4	(80.0)	0	(0)	0	(0)	5	(100)			
Doctors	1	(100)	0	(0)	0	(0)	0	(0)	1	(100)			
Total	111	(22.4)	360	(72.7)	19	(3.8)	5	(1.0)	495	(100)			

***Multiple responses.*

4.5 Relationship Between the Respondents' Sources of Nutritional Information and their Nutritional Status

The relationship between the respondents' sources of nutritional information and their nutritional status was statistically insignificant p> 0.05.

The data in Table 10 seems to be consistent with the null hypothesis which states that there will be no significant difference between the respondents' sources of nutritional information and nutritional status. This was because p > 0.05.

5. DISCUSSION

5.1 Socio-demographic Characteristics of the Participants

The age distribution of the respondents (10 to 19 years) thus reflects the normal secondary school (JSS and SSS) age range in Nigeria. The number of children in a household is assumed to determine household size and food security. Findings showed that more than half of the respondents indicated that there were more than four children in their family while others mentioned that they were just four children in the family. An overwhelming majority of the respondents are catered for by their parents; however about 41.1% engaged themselves in commercial activities after school hours in order to support themselves or their parents economically. This is not strange with the nature of the communities where the study was conducted; congested urban-slum communities, poor sanitation, no access road, refuse disposing facilities and no good drainage system. Members of the communities engaged in petty jobs and trading; these may be responsible for the lack of fund required for the optimal growth and development. As noted by Horwitz (1983) adolescents living in areas similar to those in the study area are prone to malnutrition which impair health, intellectual activity, adaptive behaviour, education, productivity and well-being, and can cause death.

5.2 Nutritional Status of Respondents

More than half of the respondents were underweight with less than 5th centile (more boys being underweight than girls). Only 41.3% respondents were of healthy weight between 5th and < 85th centile. This finding is supported by Okorie (2006) who reported that the global economic development and urbanisation has resulted in great changes in weight status among adolescents' worldwide. On the other hand, Olumakaye, [29] observed that an increasing shift towards higher rates of overweight and obesity among adolescents had been reported in developed and developing countries. Also Yamaguchi and Kandel,(1984) in their study found overweight in high school students prevalent and increased to 11.2% in 2004; but contrary to the findings of this study, Olumakaye (2008) reported that evidence showed that overweight may result in earlier onset of puberty in girls. A suggested mechanism is that adiposity may trigger estrogens production; leading to an earlier onset of menarche (Jackson and Al Mousa, 2000).

Socio-economic status (SES) was another important factor which Jackson et al. have found to be related to weight status. However, the strength of the association varies between countries. In developed countries, low SES may be associated with overweight/obesity, whereas in developing countries the opposite situation could also be the case.

5.3 Food Availability, Accessibility and Consumption

When asked about the average number of times respondents ate away from home, majority reported that they ate once away from home. Some others indicated that they ate twice away from their home. A few stated that they eat four times on the average away from home. However, a few respondents reported that they did not eat away from home. Nutritional status during adolescence plays an important role in the human lifecycle (Jackson & Al Mousa, 2000). The findings is contrary to those of Fox, Crepinsek, Connor and Battaglia (2001) where they found that 90% of schools offer an à la carte (ALC) lunch programme, and over 80% of high school students have access to vending machines, school stores, snack bars, or canteens (Morbidity Mortality Weekly Report, 2005), which offer items consistently found to be low in nutrients and high in fat, calories, and sugar (MMWR, 2005; Harnack, Snyder, Story, Holliday, Lytle and Neumark-Sztainer, 2000).

Many adolescents are becoming increasingly more westernized and pursuing greater convenience when eating out. For these

reasons, fast food restaurants have become especially popular among adolescents (Park, 2004). In fact, the main customer group of fast food restaurants is adolescents. According to a surveyed report, 54% of the adolescents who participated in the study reported fast food as their favourite away-from-home food (Jeon, Kim, Kee & Mo, 1990; Sim & Kim, 1993). In a study conducted by Choudhary, Mishra and Shukla (2009), it was found that food availability is influenced by dietary practices, cultural traditions, family structure, birth intervals, meal patterns, and food allocation. At the same time, digestion and absorption can be impeded by infection as a result of lack of environmental sanitation.

Regular daily food pattern is an indicator of good eating habit that ensures good nutritional status of adolescents. Many respondents indicated that they always have regular daily food pattern in terms of breakfast, lunch and dinner. Despite this view, many of the respondents were undernourished and few were overweight. There could be a possibility in gap of knowledge and practice of good nutrition of respondents relating to their nutritional status. As most respondents were in the junior secondary school, this, most perhaps be factor responsible for this gap in knowledge. Relating to availability and accessibility of food all the time, majority indicated that food was always available and accessible to them at all times. Further, low literacy levels, lack of awareness about nutrition and health and poverty aggravate this dismal situation.

5.4 Respondents' Sources of Nutritional Information

Information is a powerful tool and with the right information, informed decision is taken. It is important to understand how respondents received information about food. Teachers top the list of sources of information mentioned by the respondents; about half indicated that their teachers were the main source of nutrition information. Next to this were the respondents' parents. This may not be surprising as pupils/students spend most of their day time with their teachers; the students subsequently see them as their role models as well as facilitators. This is contrary to that of Wahba, Arrafa, Saleh, Mekkawy and Ahmed (2006) where they found out that frequently mentioned as the "top-of-mind" sources of information about food for their subjects was scientific journals and books especially by the scientific subjects. However, the media (magazines, newspapers and television) were least mentioned by the respondents. An overwhelming majority reported that they have benefited from the sources that provided them nutrition information. However, more than half of the respondents indicated that they would like to have more nutrition information on healthy foods, on oral hygiene, good eating behaviour and malnutrition. This is in line with Wahba et al. (2006) where they found that few respondents were interested in learning more about functional foods. The preferred sources of information as mentioned by respondents were school teachers, followed by parents, T.V. and radio.

5.5 Implications of Findings for Health Education

There is no doubt that the results of this study will have far reaching implications for planning, development, implementation and evaluation of nutrition and health education in the secondary schools in the study area and Nigeria at large. Health education is a combination of learning experiences designed to facilitate voluntary adaptation of behaviour conducive to health [30]. It is concerned with reinforcing and changing knowledge, attitudes and behaviour of people through effective communication of factual information, with the aim of helping them to ensure an optimum well-being [31]. Health education can therefore be used to bridge the gap between health information and practices within the context of nutrition and health in public secondary schools.

6. CONCLUSION

In Nigeria today, most secondary school students are malnourished due to socio economic conditions of the parent/guardian. The awareness and knowledge that need to be modified relate to nutritional information of foods. Intervention strategies such as school health education programmes which focus on the food classification, source of adequate nutritional information and health-related outcomes of adequate and inadequate nutrition could be useful. Strategies such as advocacy, health education programmes and the involvement of the adolescents in the management of food and nutrition school have high potential for being effective. The findings of this study could be used as a training needs assessment for the design and development of a training curriculum for

upgrading the knowledge and skills of policy makers, parents as well as students relating to school based nutrition programmes.

It was recommended that health and nutrition information orientation and monitoring in schools is essential so that effective interventions can be implemented to alleviate and consequently eliminate the health and nutritional problems among these adolescents.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Author has declared that no competing interests exist.

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