

Nutritional Knowledge, Physical Activity and Eating Behaviours of Adolescents in Public Schools in Uyo; Implications for Chronic Disease Prevention

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ABSTRACT

Evidence shows that low physical activity and poor eating habits in adolescents may establish behavioural patterns that will predispose them to increased chronic disease risk in adulthood. Documenting the adolescents' nutritional knowledge, physical activity and eating behaviour is an important prerequisite for designing and implementing, required nutrition education intervention. The objective of the study was to assess the nutritional knowledge, physical activity and eating behaviour of adolescents in public schools in Uyo. A structured questionnaire and a good frequency questionnaire were used to elicit socio demographic information and nutrition knowledge and behaviour of the respondents. Results showed that there was poor nutrition knowledge regarding causes of overweight/obesity and their health implication (62.1% and 38.5% respectively). About 36% had poor knowledge of causes and health implication of under-nutrition. Female were physically more active than male ($P=0.048$), mothers' qualification was also strongly associated with physical activity ($p=0.044$). A high number of respondents consumed highly processed snacks more than 5 times a week; the females significantly consumed more snacks than male; mineral (p value < 0.0001) ice cream (p value < 0.0001), egg rolls (p value $=0.025$). While only 27.3% consumed fruit and moi-moi more than 5 times per week. About 20% of respondents skipped breakfast 1-4 times/week. While 23.6% skipped more than 4 times per week, the common reason for skipping breakfast was "not hungry," (54.8%). There is an urgent need to include nutrition education in the curriculum at all levels of schooling and in a way that it will positively impact in prevention of diet related chronic-non-communicable diseases.

Keywords: Adolescents, Nutritional, knowledge behaviour, Physical Activity

INTRODUCTION

The developmental transition (physical, psychological and social), during adolescence provides a context for the development and perpetuation of eating behaviours that are substantially different from those of other stages in life^{1,2,3}. Healthy eating behaviour during adolescence is a prerequisite for physical growth, psychosocial development and cognitive performance. It also determines the present health as well as the potential to develop diet-related chronic diseases in adulthood^{4,5,6}.

At present, there is a real concern about the increase in sedentary lifestyle and unhealthy eating habits among adolescents. These include Tv/movie watching, computer and internet activities, breakfast skipping and greater consumption of highly processed foods, fast foods and sugar added drinks^{7,8,9}. Participation in health enhancing physical activity, is a key

determinant of cardiovascular and metabolic fitness as well as enhanced bone health. Poor eating behavior and limited physical activity can increase the risk of osteoporosis, obesity, hyperlipidaemia, cardiovascular disease, hypertension, Diabetes mellitus and certain cancers later in adulthood^{6,10,11}.

Adolescent eating behaviours are shaped by individual, societal and cultural factors. Some of these factors are endogenous to the individual, but others are environmental. The later include the foods made available to them inside and outside the home, the Modeling food behaviours by parents, peer and mass media influences¹². Studies from several countries show that children's eating behaviours are associated with family socioeconomic status⁹. In developed countries, irregular meal pattern and snack consumption are common especially among girls in areas with low socio economic status, while adolescents of higher socioeconomic status show a higher consumption of vegetables, fruits, dietary fibre and a lower consumption of meat, meat products and fats⁹. Studies in developed countries report poor adolescents knowledge of nutrition and healthy eating habits^{4,5}. Not much is known of the nutritional knowledge, physical activity, eating behaviour and its associated factors in adolescents in Nigeria.

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There is increased need for nutrients in adolescence¹³. Evidence exists that eating behaviour and nutritional status in adolescence, track into adulthood⁹. Unhealthy eating behavior in adolescence is a serious public health concern that should be addressed^{4,5,9,14}. Improved nutritional knowledge has potential to positively influence eating behaviours¹⁵. However adolescent are usually classified as the healthy segment of the population, (making up 10.6% of the population) as such their needs are neglected or not given priority in allocating scarce resources in developing countries such as Nigeria¹⁶.

Very few researches in Nigeria is focused on the possible links between the adolescents eating behaviour physical activity and their nutritional knowledge. In this regard, documenting the nutritional knowledge and eating behavior of adolescents in Uyo is an important pre requisite for designing and implementing nutrition intervention programs that are effective in preventing chronic diseases in adulthood^{9,17}. This study was therefore undertaken with the aim of assessing the nutritional knowledge, physical activity, eating behaviour and associated factors among adolescents in public secondary schools in Uyo, Akwa Ibom State.

MATERIALS AND METHODS

This study was a descriptive survey involving adolescents in public secondary schools in Uyo. Uyo is a fast growing capital city of Akwa Ibom State, an oil producing state in South-south, Nigeria.

Population and Sample

A total list of all public co-educational secondary school in Uyo was obtained from the state secondary educational board (SUBEB), four (4) schools were randomly selected from this list. The sample size was determined by the method of Cochran and Snedecor¹⁸ as follows:

$$n = \frac{Z^2 pq}{d^2}$$

Where: $z = 1.96$, corresponding to 95% confidence level,

$d = 0.5$ (5% acceptable margin of error).

$p = .29$ (29% good nutritional knowledge of secondary school students in Sokoto¹⁵).

$q = 1-p$

This came to 272. This was made up to 400 to make up for attrition.

Using multistaged sampling by school population, number and sex distribution in each class, 400 students were randomly selected to participate in the study. They were 150 males and 250 females.

Ethnical consideration

The protocol for the study was approved by the Akwa Ibom State ethical committee domiciled in the state Ministry of Health. Furthermore, permission was obtained from all school principals in the selected schools to carry out the study in their schools. The nature of the study was explained to the parent of each selected student, and the confidentiality of their children/wards responses assured through a letter. They were free to opt out, parents of participating students gave informed consent.

Exclusion criteria

All students who had a limb deformity or were ill at the time of the study, were excluded from the sample. The instrument used is an adaptation of the research instrument of Essien *et al.*¹⁵ and Onyiriuka *et al.*¹. It was pilot tested using 100 adolescents in four large churches attending secondary school in Uyo for validity and reliability, correction to the instrument were then made accordingly.

A structured questionnaire was used to elicit information on the socio-demographic characteristics of the study participants.

1. **Socioeconomic status (SES):** The socio economic status (SES) classification of the students was based on an adaptation to the method of Ogunlesi *et al.*¹⁹. The students socio-economic status (SES) was based on their score in an ascending order of 4 variables assessed vis: (i) father and mother's highest educational level; (2) father and mother's occupation; (3) type and family ownership of house occupied and (4) family ownership of car(s). Each student had a "SES score" which was graded as follows: 3-4 low; 5-6 medium and 7-9 high.

2. **Nutritional knowledge:** The participants' nutritional knowledge was assessed by a 12 item questionnaire of multiple choice questions set by the researchers. The items dealt with such issues as perception of underweight/overweight, sources of nutritional knowledge, causes of malnutrition/under nutrition, signs and symptoms of common nutrient deficiency diseases and health consequences of under nutrition as well as of overweight and obesity. Their nutritional knowledge was graded in ascending order of correct knowledge as follows: 1-8 (poor); 9-16 (fair) and 17-24 (good).
 3. **Physical activity:** Physical activity profile of study participants was based on an adaptation of Opara *et al.*²⁰. Their physical activity pattern was scored on 6 items. Students were scored from 1-18 in ascending order of hours spent on moderate to strenuous physical activity per day. Each student had a physical activity score. Physical activity was graded as follows: 1-6 (low); 7-12 (medium) and 13-18 (high).
 4. **Eating behaviour:** students eating behaviour was based on an adaptation of Opara *et al.*²⁰. Students were asked the following questions:
 - (i) Breakfast skipping frequency per week ranging from never, 1-4 times and more than 4 times.
 - (ii) Reason for skipping breakfast
- 4(b)
- (i) Food usually consumed for breakfast (e.g. fruits/fruits products, bread & beverage, cereals, beans & beans products, garri/fo-fo and soup)
 - (ii) A food frequency questionnaire was used to record the frequency with which students consumed different types of snacks ranging from 1-4 (low) and 5-8 (high). Each student had a score for frequency of eating “healthy” and “unhealthy” snacks per week.

“Healthy” snacks included moi-moi, groundnut, fruits, etc. while “unhealthy” snacks included sugar added drinks, biscuits, ice-cream, processed dough product, etc. and unhealthy eating score based on a weighting of the composite of their eating behaviours. Each student had a 'healthy eating score' ranging from 1-8 and graded as follows: 1-4 (low score) and 5-8 (high score).

Data collection

Data collating and editing was done manually. Data processing and analysis were done using Microsoft excel and strata version 10:00. Statistical methods used were Mean, Standard Deviation, Frequency, Percentages, Pearson's chi square and Fischer exact test. Statistical significant was set at $P < 0.05$.

RESULTS

There were 132 (35.0%) males and 245 (65.0%) females. About 54% of respondents were 14-19 years, while 17 (45.6%) were aged 10-14 years. The differences in age and gender were statistically significant ($P < 0.05$). About 50% of the mothers' respondents had secondary school education (40.9%), 138 (36.6%) had tertiary education, 42 (11.1%) had primary education, while only 14 (10.6%) had no formal education. The differences in mothers' level of education was not statistically different by gender ($p > 0.05$). Majority of the students mothers were artisans (51.3%) followed by civil servants (33.7%), health workers (8.8%) and 24 (6.4%) who were housewives. More than half of the study participants were either 1st or 2nd birth order, 115 (30.5%) were either 2nd or 3rd birth order, 40 (13.0%) were 5th or 6th while 19 (50%) were 7th or more in birth order. More than half (54.9%) of respondents were of medium social economic status, 107 (28.4%) were high and 63 (16.7%) were of low socio economic profile ($P < 0.05$) Table 1.

Table 1: Socio-demographic characteristic and factors associated with the respondents' eating behaviour

Characteristics	Good diet (n= 377)		Bad diet (n=377)		Statistical indices
	High (n=214)	Low (n=163)	High (n=222)	Low (n=155)	
Sex					$\chi^2 = 30.13$
Male	53 (24.8)	74 (46.8)	63 (28.4)	69 (44.5)	Df=3
Female	161 (75.2)	84 (53.2)	159 (71.6)	86 (55.5)	P<0.0001+
Age					$\chi^2 = 1.412$
9-13	93 (43.5)	79 (48.5)	98 (44.1)	74 (47.7)	Df=3
14 and above	121 (56.5)	84 (51.5)	124 (55.9)	81 (52.3)	p>0.05
Mother's Occupation					$\chi^2 = 9.830$
Artisan	120 (56.7)	73 (44.8)	117 (52.7)	76 (49.0)	Df = 9
Civil servant	61 (28.5)	66 (40.5)	68 (30.6)	59 (38.1)	p>0.05
House wife	15 (7.0)	9 (5.5)	17 (7.7)	7 (4.5)	
Health worker	18 (8.4)	15 (9.2)	20 (9.0)	13 (8.4)	
Mother's Qualification					$\chi^2 = 3.878$
No formal education	28 (13.1)	15 (9.2)	27 (12.2)	16 (10.3)	Df = 9
FSLC	27 (12.6)	15 (9.2)	26 (11.7)	16 (10.3)	
Secondary	81 (37.9)	73 (44.8)	90 (40.5)	64 (41.3)	p>0.05
Post Secondary	78 (36.5)	60 (36.8)	79 (35.6)	39 (38.1)	
Birth position					$\chi^2 = 2.811$
1-2	107 (50.0)	87 (53.4)	113 (50.9)	81 (52.3)	Df = 9
3-4	66 (30.8)	49 (30.1)	67 (30.2)	48 (31.0)	
5-6	32 (15.0)	17 (10.4)	31 (14.0)	18 (11.6)	p>0.05
Above 6	9 (4.2)	10 (6.1)	11 (5.0)	8 (5.2)	
Social Profile					$\chi^2 = 65.805$
High	57 (26.6)	50 (30.7)	61 (27.5)	46 (29.7)	Df = 6
Medium	121 (56.5)	86 (52.8)	128 (57.7)	79 (51.0)	
Low	36 (16.8)	27 (16.7)	33 (14.9)	30 (19.4)	p>0.05

More than two hundred respondents were aware of the idea of measurement of nutritional status. Twenty seven per cent had a good knowledge of factors affecting nutritional status, while only 9.6% had a knowledge of the causes of obesity/overweight, 107 (28.4%) had a fair knowledge, while majority (62.1%) had poor knowledge of the causes of obesity and overweight. Only 22% had good knowledge of the health implications. The differences in these knowledge was statistically significant between male and female students (p<0.05). About 23% of respondents had a good knowledge of the causes

of under nutrition, while 168 (44.6%) had a good knowledge of its health implications. About 36% of respondents had poor knowledge of both the causes and health implications of under nutrition. The differences in knowledge was statistically significant between male and female students (P<0.05) (Table 2). Majority of students (58.7%) reported their teachers as the source of their nutritional knowledge, TV/radio (20.7%), family/friends (8.1%), internet (6.3%), and newspaper (6.3%) were other sources of nutritional knowledge reported by students.

Table 2: Nutritional knowledge of the respondents

Variables	Male (n = 132)	Female (245)	Total (n = 377)	Statistical indices
Knowledge of own nutritional status				
Yes				Df = 1
No	70 (53.0)	144 (58.8)	214 (56.8)	$\chi^2 = 1.1537$
	62 (47.0)	101 (41.2)	163 (43.2)	P value = 0.283
Knowledge of factors affecting nutritional status				
Good	42 (31.8)	60 (24.5)	102 (27.1)	Df = 2
Fair	70 (53.0)	120 (49.0)	190 (50.4)	$\chi^2 = 6.9085$
Poor	20 (15.2)	65 (26.5)	85 (22.6)	P value = 0.032*
Knowledge of causes of overweight/obesity				
Good				
Fair	19 (14.4)	17 (6.9)	36 (9.6)	Df = 2
Poor	28 (21.2)	79 (32.2)	107 (28.4)	$\chi^2 = 8.8487$
	85 (64.4)	149 (60.8)	234 (62.1)	P value = 0.012*
Knowledge of health implications of overweight/ obesity				
Good	26 (19.7)	34 (13.9)	83 (22.0)	Df = 2
Fair	65 (49.2)	107 (43.7)	132 (43.0)	$\chi^2 = 5.3011$
Poor	41 (31.1)	104 (42.5)	162 (38.5)	P value = 0.071
Knowledge of causes of under nutrition				
Good	40 (30.3)	47 (19.2)	87 (23.1)	Df = 2
Fair	53 (40.2)	100 (40.8)	153 (40.6)	$\chi^2 = 7.1854$
Poor	39 (29.6)	98 (40.0)	137 (36.3)	P value = 0.028*
Knowledge of health implications of under nutrition				
Good	77 (58.3)	91 (37.1)	168 (23.1)	Df = 2
Fair	16 (12.1)	56 (22.9)	72 (19.1)	$\chi^2 = 16.4011$
Poor	39 (29.6)	98 (40.0)	137 (36.3)	P value = 0.0001*

Physical Activity Pattern: A high proportion of the female students (88.3%) reported high physical activity profile, followed by 95 (58.60%) of males. Thirty percent of males reported medium physical activity, while only 17 (8.3) of female reported the same. Only 7 males (4.3) and 7 (3.4) females reported low physical activity. The differences in physical activity was statistically significant between males and female adolescent

students. Of the factors associated with different levels of physical activity, only maternal level of education and gender were statistically significant ($P < 0.05$), while the difference in physical activity level by age, mothers occupation and socio-economic status of the students were not statistically significant ($P > 0.05$) in each case (Table 3).

Table 3: Factors Associated with the physical activity profile of the respondents

Variables	Physical activity profile			Total (n = 377)	Statistical indices
	High (n = 276)	Medium (n = 87)	Low (n = 14)		
Sex					
Male	95 (34.4)	60 (77.9)	7 (50.0)	162 (44.1)	Df = 2 $\chi^2 = 14.4$ P value = 0.048*
Female	181 (65.6)	17 (22.1)	7 (50.0)	205 (55.1)	
Age					
9 – 13	127 (46.0)	39 (44.8)	6 (42.9)	172 (45.6)	Df = 2 $\chi^2 = 0.0824$ P value = 0.960
14 and above	149 (54.0)	48 (55.2)	8 (57.1)	205 (54.4)	
Birth position					
1-2	141 (51.1)	46 (52.9)	7 (50.0)	194 (51.5)	Df = 6 $\chi^2 = 2.4995$ P value = 0.874
3-4	79 (28.6)	31 (35.6)	5 (35.7)	115 (30.5)	
5-6	38 (13.8)	9 (10.3)	2 (14.3)	49 (13.0)	
Above 6	18 (6.5)	1 (1.2)	0 (0.0)	19 (5.0)	
Mother's Qualification					
No formal education	24 (8.7)	16 (18.4)	3 (21.4)	43 (11.4)	Df = 6 $\chi^2 = 11.7345$ P value = 0.044*
FSLC	33 (12.0)	7 (8.1)	2 (14.3)	42 (11.1)	
Secondary	120 (43.5)	32 (36.8)	2 (14.3)	154 (40.9)	
Post secondary	99 (35.9)	32 (36.8)	7 (50.0)	138 (36.6)	
Mother's occupation					
Artisan	143 (51.8)	44 (50.6)	6 (42.9)	193 (51.2)	Df = 6 $\chi^2 = 2.4995$ P value = 0.874
Civil servant	93 (33.7)	28 (32.2)	6 (42.9)	127 (33.7)	
Housewife	18 (6.5)	6 (6.9)	0 (0.0)	24 (6.4)	
Health worker	22 (8.0)	9 (10.3)	2 (14.3)	33 (8.8)	
Socio-economic status					
High	78 (28.3)	26 (29.9)	3 (21.4)	107 (28.4)	Df = 4 $\chi^2 = 4.4027$ P value = 0.37
Medium	151 (54.7)	45 (51.7)	11 (78.6)	207 (54.9)	
Low	47 (17.0)	16 (18.4)	0 (0.0)	63 (16.7)	

* p significant at <0.05

Eating Behaviour: The snacks consumption pattern of the respondents is shown on table 4. The most commonly consumed snacks was sugar added bottled drinks consumed more than 5 to 8 times per week by 48% of the respondents. This was followed by icecream consumed by 47.2% of the respondents 5 to 8 times per week. Egg roll was consumed by 44% of the students almost every day followed by meat pie which was consumed 5-8 times a week by 40.3% of respondents. More than 29% of the respondents ate biscuits everyday while 103 (27.3%) ate fruits and 27% also ate moi-moi more than 5 to 8 times per week while majority (57%) ate moi-moi or fruits, 57% less than 3 times per week. The differences in consumption of “unhealthy snacks”

between male and female adolescents were statistically significant ($p < 0.05$), with more females consuming them more than males (Table 4). Majority of respondent (56.8%), never skipped breakfast, while 19.6% skipped breakfast 1-4 times per week. The most frequently given reasons for skipping breakfast were not hungry (54.8%), no time (24.2%), no money (17.8%) and (3.2%) to prevent weight gain. The food most taken by majority of students for breakfast was bread and beverage (65.5%), followed by cereals (rice, corn, wheat) 12.2%, Garri/foofoo and soup (10.3%), fruit/fruit juice (8.2%) while 3.7% reported having beans/beans products for breakfast (Table 5).

Table 4: Weekly frequency of the snacks taken by the respondents

Variables	Male (n = 132)	Female (n = 245)	Total (n = 377)	Statistical indices
Moi-moi				
Less than 3 times	73 (55.3)	142 (58.0)	215 (57.0)	Df = 2
3-5 times	25 (18.9)	34 (13.9)	59 (15.7)	$\chi^2 = 1.6923$
More than 5 times	34 (25.8)	69 (28.2)	103 (27.3)	P value = 429
Biscuits				
Less than 3 times	50 (37.9)	102 (41.6)	152 (40.3)	Df = 2
3-5 times	39 (29.6)	74 (30.2)	113 (30.0)	$\chi^2 = 0.8744$
More than 5 times	43 (32.6)	69 (28.2)	112 (29.7)	P value = 0.646
Minerals				
Less than 3 times	50 (37.9)	56 (22.9)	106 (28.1)	Df = 2
3-5 times	35 (26.5)	55 (22.5)	90 (23.9)	$\chi^2 = 13.9885$
More than 5 times	47 (35.6)	134 (54.7)	181 (48.0)	P value = 0.001+
Groundnut				
Less than 3 times	52 (39.4)	63 (25.7)	115 (30.5)	Df = 2
3-5 times	38 (28.8)	80 (32.7)	118 (31.3)	$\chi^2 = 7.8352$
More than 5 times	42 (31.8)	102 (41.6)	144 (38.2)	P value = 0.020*
Ice cream				
Less than 3 times	59 (44.7)	70 (28.6)	129 (34.2)	Df = 2
3-5 times	29 (22.0)	41 (16.7)	70 (18.6)	$\chi^2 = 16.0749$
More than 5 times	44 (33.3)	134 (54.7)	178 (47.2)	P value <0.0001+
Egg roll				
Less than 3 times	49 (37.1)	70 (28.6)	119 (31.6)	Df = 2
3-5 times	37 (28.0)	54 (22.0)	91 (24.1)	$\chi^2 = 7.3551$
More than 5 times	46 (34.9)	121 (49.4)	167 (44.0)	P value = 0.025+
Meat pie				
Less than 3 times	47 (35.6)	81 (33.1)	128 (34.0)	Df = 2
3-5 times	38 (28.9)	59 (24.1)	97 (25.3)	$\chi^2 = 2.0207$
More than 5 times	47 (35.6)	105 (42.9)	152 (40.3)	P value = 0.364
Fruit				
Less than 3 times	73 (55.3)	142 (58.0)	215 (57.0)	Df = 2
3-5 times	25 (18.9)	34 (13.9)	59 (15.7)	$\chi^2 = 1.6923$
More than 5 times	34 (25.8)	69 (28.1)	103 (27.3)	P value = 0.429

Table 5: Breakfast Behaviour

Frequency of skipping breakfast in a week	Frequency n (%)
Never	214 (56.8)
1-4 times	74 (19.6)
More than 4 times	89 (23.6)
Reasons for not taking breakfast	Frequency n (%)
Prevent weight gain	2 (3.2)
No money	11 (17.7)
No time	15 (24.2)
Not hungry	34 (54.8)
Foods usually eaten for breakfast	Frequency n (%)
Fruits/fruit juice	31 (8.2)
Bread/beverages/	247 (65.5)
Cereals, rice, corn, wheat	46 (12.2)
Beans & beans products	14 (3.7)
Garri/fofo-fofo & soup	39 (10.3)

The factors associated with the eating behaviour of the adolescent students are presented on Table 1. Among the factors associated with the eating behaviour of students, only sex and socio economic status were statistically significant each ($p < 0.05$) as shown. The relationship of age, birth order, mother's occupation and mother's level of education to adolescents eating behaviour were not statistically significant $P > 0.05$ (table 1). The

relationship of the students level of nutritional knowledge and their breakfast consumption pattern is shown on Table 6. The knowledge of health implications of overweight/obesity had a statistically significant relationship with breakfast skipping pattern ($p < 0.05$) while others types of nutritional knowledge ($p > 0.05$) Table 6).

Table 6. Relationship of level of knowledge and breakfast consumption pattern among the respondents

Variables	Breakfast consumption patterning n (%)			Total (n = 377)	Statistical indices
	Never (n = 214)	1 – 4 times (n = 74)	More than 4 times (n = 89)		
Knowledge of own nutritional status					
Good	21 (9.8)	11 (14.9)	4 (4.5)	36 (9.6)	Df = 1
Fair	55 (25.8)	26 (35.1)	26 (29.2)	107 (28.4)	$\chi^2 = 8.5332$
Bad	138 (64.5)	37 (50.0)	59 (66.3)	234 (62.1)	P value = 0.067
Knowledge of factors affecting nutritional status					
Good	58 (27.1)	19 (25.7)	25 (28.1)	102 (27.1)	Df = 4
Fair	107 (50.0)	45 (60.8)	38 (42.7)	190 (50.1)	$\chi^2 = 7.1779$
Bad	49 (22.9)	10 (13.5)	26 (29.2)	85 (22.6)	P value = 0.127
Knowledge of health implication of under nutrition					
Good	93 (43.5)	36 (48.7)	39 (43.8)	168 (44.6)	Df = 4
Fair	37 (17.3)	15 (20.3)	20 (22.5)	72 (19.1)	$\chi^2 = 2.5293$
Bad	84 (39.3)	23 (31.3)	30 (33.7)	137 (36.3)	P value = 0.639*
Knowledge of health implication					
Good	34 (15.9)	13 (17.6)	13 (14.6)	60 (15.9)	Df = 4
Fair	79 (36.9)	47 (63.5)	46 (51.7)	172 (45.6)	$\chi^2 = 21.8033$
Bad	101 (47.2)	14 (18.9)	30 (33.7)	145 (38.5)	P value = 0.0001*
Knowledge of what can result in under nutrition					
Good	46 (21.5)	17 (23.0)	24 (27.0)	87 (23.1)	Df = 4
Fair	84 (39.3)	34 (46.0)	35 (39.3)	153 (40.6)	$\chi^2 = 2.7005$
Bad	84 (39.3)	23 (31.1)	30 (33.7)	137 (36.3)	P value = 0.609

DISCUSSION

The aim of the study was to examine the factors associated with nutritional knowledge, physical activity, and eating behaviours of adolescents in public secondary schools in Uyo, Akwa Ibom State.

Nutritional Knowledge: The current study has shown that majority of respondents had a fair knowledge of factors affecting nutritional status. Girls had significantly higher knowledge than boys. Both findings are in line with the finding of other studies in adolescent and adults, both in developed and in developing countries^{4,5,7,15,21,22}. This is plausible since it is known that girls are more concerned about food selection, in addition the Nigerian culture and socialization of females is consistent with their better nutritional knowledge.

Our findings have shown that majority of the respondents had poor knowledge of the causes of overweight/obesity as well as the health implications of both overweight/obesity and under nutrition, it was not surprising that respondents had poor knowledge of the causes and health implications of overweight and obesity since the health emphasis in many developing countries centres on under nutrition rather than the recently emerging epidemic of diet-related chronic non-communicable diseases²³.

This finding calls for urgent need capacity building in nutrition education as well as need to include in the school curriculum, content and methods of teaching to cover all levels of education, especially with all the confusing messages from food advertisement and the internet^{24,25}. Improved nutrition education has

great potential to positively impact eating behaviours of adolescents and hence their immediate and long health term as adults^{11,15,22,26}. This is very important, since majority of the adolescents reported their teacher as the source of their nutrition information, while others reported mass media and internet as their sources. The Nigerian adolescent health policy lists nutrition as one of the focus areas. It cannot be ascertained how far these policies have been implemented.

Physical Activity

The present study has found out that a high proportion of adolescents reported high physical activity profile. This may be explained by the level of development of the state/country. In addition public schools in Nigeria are not usually patronized by the well to do, who prefer to send their children to better equipped private schools²⁷. The culture also encourages children to engage in house chores as well as family economic activities (such as trading, farming, etc). Adequate physical activity is consistent with good health in the immediate and long term²⁶. Only very few respondents reported low physical activity profile. It has been reported that low levels of physical activity and highly sedentary leisure habits in youth may establish behavioural patterns that will predispose youth to increased chronic disease risk in adulthood and thus it is desirable to establish healthy habits in adolescents^{22,28,29}. In this regard physical activity throughout the life course is desirable.

In an analysis of leisure time physical activity among students from 23 countries, they posited that though there was a general decline in physical activities in leisure time, this varied with cultural and developmental factors³⁰. It has also been reported that male adolescents were more physically active than female³¹ which was at variance with the findings of the present study. Both physical activity was significantly related to both gender and mothers' educational qualification. The findings of this study had revealed that girls were more physically active than boys may be explained by culture and socialization of females in Nigeria to be engaged in household chores and cooking. This is at variance with findings in more developed countries where male adolescents were more physical active than females^{7,32,33}.

Eating Behaviour

1. **Snack consumption:** The finding of the present study has shown that respondents consumed more processed and sugar added drinks in preference to healthy traditional snacks. This is in agreement with the findings of Opara *et al.*²⁷ in their study of school aged children in private and public primary schools in Uyo. Also in agreement with the findings of a study of snack consumption of students in other cities in Nigeria^{1,34}. This same preference for highly processed food is reflected in the consumption of such foods by majority of respondents for breakfast while the least consumed is the more healthy local foods. The adoption of the so called western plate has been implicated in the upsurge in prevalence of chronic diseases in countries in epidemiological and nutritional transition such as Nigeria¹⁰. Similar findings were reported in a study of adolescents eating behaviours in other countries^{7,8,14}.

The present study found out that breakfast skipping was extremely common among adolescents studied. The most frequently reported reasons for skipping breakfast were not hungry and no time respectively. A negligible few of the respondents in the present study gave to prevent weight loss as their reason for skipping breakfast. It has been reported that adolescent girls in developed countries skip meals due to psychological variables including expectancy theories, emotional eating, etc^{2,35}.

It has been reported that low social economic status, being female, older age of adolescents is associated with breakfast skipping^{32,33}. Evidence exists that eating breakfast is associated with overall with more healthful food habits, while breakfast skippers have an overall diet that is inadequate^{32,36}.

We found very low consumption of fruits among respondents in the present study. Similar findings had been extensively reported. Factors associated with frequent fruit consumption included high socio-economic status, rural dwelling, being female, younger age of adolescents, parental preferences, and lower level of maternal education^{7,9,14,32,33}. It is postulated that

more educated mothers were more concerned with the growth of their children rather than the prospect of chronic diseases later in life⁹. However, mothers' nutritional knowledge, health consciousness and exposure to media influences their children diet more than family resources and access to foods available in developing countries undergoing rapid social and economic transition⁹. Child feeding practices have the potential to affect children's energy balance, via evidence exists that imposition of stringent parental controls can potentiate preference for high fat, energy dense foods and disrupt children's regulation of energy intake by altering their responsiveness to internal cues of hunger and safety¹².

This study has found out that, social economic status and knowledge of health implications of nutritional status were associated with better eating behaviour. In this regard Peilin *et al.*¹¹ recommended models of nutrition education intervention to deliver healthy diet, nutrition information, etc in a manner that will positively impact eating behaviours.

CONCLUSION

There is poor nutritional knowledge in respect of health implications of under nutrition, overweight and obesity. There is poor eating habit characterized by meal and breakfast skipping, preference for highly processed food and poor fruit consumption among adolescents in public secondary schools in Uyo. This calls for urgent need for national policy on nutrition education at all levels of schooling and among mothers to foster health and longevity, and contain the looming epidemic of chronic non-communicable diseases.

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