

Obesity and Overweight among in-School Students in Private and Public Schools in Ibadan North Local Government Area, Oyo State: A Comparative Study

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ABSTRACT

The growing alarming rate of obesity worldwide is a great concern to individuals and the general public. This has been the trend among secondary schools in many parts of the world in the past three decades. This study, therefore, was aimed at assessing the obesity and overweight among in-school students in public and private schools in Ibadan North Local Government, Oyo State Nigeria.

A comparative cross sectional study was carried out among in-school students in Ibadan North Local Government area Oyo State Nigeria. Four hundred (400) respondents were selected using multi-stage sampling technique. Information from respondents was obtained using pre-tested semi-structured questionnaires. Data analysis was done with Statistical Package for Social Sciences (SPSS) version 21.

The results showed that when Body Mass Index was used as a measure of obesity, the number of overweight and obesity was significantly more in private schools than in public schools with a p-value less than 0.001. Using Waist and Hip Ratio private school have significantly higher number of obese compared to the public. Body Image Discrepancy private school was higher than that of the public school, but the difference was not statistically high. The nutritional rating of the respondents showed that few of the private students on first day, about one third on the second day and the same on the third day had a healthy eating index. Majority of the respondents scored below six percent which is an indication that many of them are not eating well, that is they are not abiding by the food pyramid rules of daily recommended dietary allowances (RDAs). The nutritional status was significantly associated with the gender, types of school, age groups and class categories of the respondents.

The study concludes that WHR detects more of central obesity while BMI accounts for generalised obesity. There was a significant difference in the feeding patterns and activity patterns of the students attending public and private schools. Factors associated with the nutritional status of the respondents were their age, gender, the type of schools and their class categories.

Keywords: Overweight, Obesity, Adolescents, Secondary school students, Public and private schools.

INTRODUCTION

According to the World Health Organization (WHO), over the past three decades the prevalence of overweight and obesity has increased substantially (WHO, 2010). Globally, an estimated 170 million children (aged less than 18 years) are estimated to be overweight (WHO, 2010). The highest prevalence of childhood overweight is in upper-middle-income countries, and, when taken as group, low-income countries have the lowest prevalence rate (WHO, 2012). However, overweight is rising in almost all countries, with

prevalence rates growing fastest in lower- middle-income countries (WHO, 2012).

Overweight and obesity can be defined as ‘abnormal or excessive fat accumulation that may impair health’ (Ajayi et al, 2015). Overweight and obesity is also referred to as a complex disorder involving appetite regulation and energy metabolism. It is also the condition whereby someone has a Body Mass Index (BMI) of 30 or over (WHO, 2012).

In recent decades, there has been a significant increase in overweight and obesity prevalence rates in many countries around the world (Adeomi et al, 2014). According to the WHO, excess body weight poses one of the most serious public health challenges of the 21st century (WHO, 2012). The WHO’s latest projections indicate that globally in 2005 there were approximately 1.6 billion adults (10 years and over) overweight and at least 400 million obese (WHO, 2018). In Europe, the World Health Organization reported that the rapidly increasing prevalence of obesity with the estimate of 150 million adults and 15 million children which is having high effect on the public health (WHO, 2010). Even in the developing world, there is evidence that levels of overweight and obesity are increasingly affecting population health, many of who already suffer from the effects of malnutrition.

Obesity and overweight represent a rapidly growing risk to the health of the people in an increasing number of countries (WHO, 2010). For many developing countries, obesity and its consequence have become a challenge similar to hunger and under nutrition (Kennedy et al., 2017).

Children and adolescent obesity is progressively being observed through the individual lifestyle due to increased purchasing power, luxurious living, increasing hours of inactivity due to television, video games, and computers, which seems to substitute the outdoor games and other social activities (Sikorski, 2014). The trend of obesity and overweight is rising with urbanization, changes in lifestyle and social economic transition. Social changes is considered to be among the causes of obesity and its prevalence has increased from 4.2% to 6.7% between 1990 to 2010 and this trend is anticipated to reach 10.1% by 2025 (DeNoon, 2010). The estimated prevalence of childhood overweight and obesity in Africa in 2010 was 8.5% and is expected to reach 12.7% in 2020 and 17.8% in 2022 (WHO, 2010).

Socially, obesity has several effects on the individual such as poor mental and emotional health status (Sabageh et al, 2013). Psychological effects may set in as a result of the ridicule, teasing and bullying encountered leading to rejection/isolation, anxiety and low self-esteem. As obesity rates soar worldwide reaching near epidemic proportions, so too is discrimination and bias against the obese. Obesity brings about humiliation leading to stigmatization. This is very hard to shed especially among children and adolescent obese. Often they are regarded as lazy, unsuccessful and non-compliant. The adult obese are often treated with lack of respect by the medical community as revealed by some medical profession members. Due to lack of movement the obese are isolated and regarded as anti-social leading to depression and possible suicide on the long run.

In recent decades, there has been a significant increase in overweight and obesity prevalence rates in many countries around the world. According to the WHO, excess body weight poses one of the most serious public health challenges of the 21st century (WHO, 2012). The WHO’s latest projections indicate that globally in 2005 there were approximately 1.6 billion adults (10 years and over) overweight and at least 400 million obese (WHO, 2010). In Europe, the WHO contends that the rapidly increasing prevalence of obesity will include 150 million adults and 15 million children by 2010 (WHO, 2010). Even in the developing world, there is evidence that levels of overweight and obesity are increasingly affecting population health, many of who already suffer from the effects of malnutrition. In 2017 United Nation (UN) study discovered obesity in many developing regions and growing rapidly, even in countries where hunger exists (Unicef, 2017).

The prevalence of overweight and obesity in children has dramatically increased over the past two decades.

In 2010, 43 million children were overweight or obese 35 million of whom lived in developing countries and this number is expected to reach 60 million by 2020 (Ying-Xiu Zhang et al, 2016). Overweight or obese children are likely to remain so in adulthood and are also at high risk of developing non communicable diseases (NCDs) like diabetes, hypertension, cardiovascular diseases and some form of cancers (WHO, 2012). These non-communicable diseases are increasing alarmingly in Sub-Saharan overweight individuals in which residing in cities provides more access to more fast foods and the emergence of people with high economic income that can afford the fast foods, that is foods with high glycaemic index (Muhihi, 2012). Recently there is an increasing prevalence of childhood obesity (5-19years) due to rapidly changing of dietary practices and a sedentary lifestyle in developing countries (Galsonl, 2018). The increase in prevalence of childhood overweight and obesity in Sub- Sahara Africa (SSA) was due to the infectious diseases and under nutrition in children which constitute the major problem. Health wise, obesity has been known to reduce the quality of life of an individual leading to premature mortality or reduction in Quality Adjusted Life Years (QALYs) due to the onset of chronic diseases (IQEHC, 2015).

The prevalence of obesity among children aged 6 to 11 years increased from 6.5% in 1980 to 19.6%, while, in the same years, that of children in the age group of 12 to 19 increased from 5.0% to 18.1% in 2008 (Ogden, 2010). Once considered a problem only in high-income countries, childhood overweight and obesity are on the rise in low and middle income countries, particularly in urban settings that are currently faced with physical activity and nutrition transition. This has led to overconsumption of energy dense foods with reduced participation in physical activity (Kumar, 2017). In developing countries especially in urban populations, childhood obesity is emerging as a major health problem. Several studies in Africa and other developing countries have documented an emerging trend of malnutrition with overweight and obesity increasing at an alarming rate in comparison to under nutrition (Popkin and Adair, 2012). In a study to assess the prevalence of overweight/obesity among primary school pupil in urban centers in Nigeria, 17.4% of the pupils studied were found to be overweight/obese (Ajayi et al., 2015).

However, this study investigate the prevalence and health implication of obesity and overweight among in-school aged children in private and public schools in Ibadan north local government area, Oyo state.

METHODOLOGY

A comparative cross sectional study was carried out among in-school students in Ibadan north local government area Oyo State, Nigeria. The population of Ibadan North was 856,988 (Oyo State Government, 2017). It comprises of Twelve Electoral Wards. It also has bustling academic and economy activities with the presence of the first Premier University in Nigeria, the University of Ibadan and The Polytechnic Ibadan.

The population for this study comprised secondary school students (both junior and senior) attending public and private secondary schools in Ibadan north local government area, Oyo state. Four hundred (400) respondents were selected using multi-stage sampling technique. Information from students was obtained using pre-tested semi-structured questionnaires.

Data collection was done through a self-administered questionnaire. Four (4) Research assistants were recruited for the study. The research assistants were trained for two days in data collection and measurement taking.

Semi-structured self-administered questionnaire that contain six sections with the following headings was used:

Section A: socio-demographic data

Section B: Family Characteristics of the Respondents

Section C: Meal Pattern among the Respondents

Section D: Physical Activities

Section E: Anthropometry

Section F: Body Image Discrepancy

The Seca electronic bathroom weighing scale for measuring weight in kilograms (kg) was the anthropometric measurements instruments used. Every morning before taking measurements, the weighing scales were standardized using known weights. Height was measured with a stadiometer. Waist circumference and Hip circumference were measured in centimetres using a measuring tape.

Weight Measurement: The weight of each student was measured in their underclothes, barefoot and the pupils stood still without support and the researcher/a research assistant took the measurements. Measurements were taken to the nearest tenth of a kilogramme.

Height Measurement: The height of each student was taken as the maximum vertical distance from the floor to the highest point on the skull (i.e. the vertex) when the head is held in the Frankfort plane. The students stood erect, barefoot, heels together, both heels touching the base of the stadiometer and arms hanging freely by the sides. Measurements were taken to the nearest tenth of a centimetre.

Waist and Hip Circumference Measurements: The waist circumference was taken with the measuring tape wound round the student at the level of the umbilicus, while the hip circumference were at the level of the tip of the buttocks and the greater trochanters, and these measurements were taken in centimetre. Data analysis was done with Statistical Package for Social Sciences (SPSS) version 21.

FINDINGS

Table 1: Socio-Demographic Characteristics of the Respondents (N = 400)

Variables	Type of School		Statistics
	Public (%)	Private (%)	
Age groups (in years)			
< 15	153 (75.7)	82 (41.4)	$X^2 = 50.441$
15 – 19	49 (24.3)	111 (56.1)	df = 2
> 19	0 (0.0)	5 (2.5)	p < 0.001*
Sex			$X^2 = 1.431$
Male	93 (46.0)	103 (52.0)	df = 1
Female	109 (54.0)	95 (48.0)	p = 0.232
Class			$X^2 = 244.8$
Junior secondary	202 (100.0)	48 (24.2)	df = 1
Senior secondary	0 (0.0)	150 (75.8)	p < 0.001*
Religion			
Christianity	22 (10.9)	24 (12.1)	$X^2 = 1.118$
Islam	179 (88.6)	174 (87.9)	df = 2
Traditionalist	1 (0.5)	0 (0.0)	p = 0.572

Tribe			
Yoruba	196 (97.0)	188 (94.9)	$X^2 = 5.994$
Hausa	0 (0.0)	5 (2.5)	df = 3
Igbo	2 (1.0)	3 (1.5)	p = 0.112
Others	4 (2.0)	2 (1.0)	
Parent (s) Marital Status:			
Single	6(2.9)	2(1.0)	$X^2 = 0.931$
Married	185(91.6)	189(95.5)	df = 2
Divorced	11(5.5)	7(3.5)	p = 0.469
Father's occupation			
Unemployed	6 (3.0)	3 (1.5)	$X^2 = 53.115$
Unskilled (e.g. cleaners)	75 (37.1)	68 (34.3)	df = 3
Skilled (e.g. artisans)	62 (30.7)	12 (6.1)	p < 0.001*
Professionals	59 (29.2)	115 (58.1)	
Mother's occupation			
Unemployed	1 (0.5)	1 (0.5)	$X^2 = 38.856$
Unskilled (e.g. cleaners)	136 (67.3)	111 (56.1)	df = 3
Skilled (e.g. artisans)	34 (16.8)	8 (4.0)	p < 0.001*
Professionals	31 (15.3)	78 (39.4)	

* Statistically significant

The socio-demographic characteristics of respondents are as shown in Table 1 above. Majority of the respondents in the public schools were less than 15 years (153, 75.7%), while majority of those from private schools were 15 – 19 years (111, 56.1%).

Table 2: Family Characteristics of Respondents (N = 400)

Variable	School Type		Statistics
	Public (n = 202)	Private (n = 198)	
Who you live with			$X^2 = 2.86$
Both parents	133 (65.8)	136 (68.7)	df = 3
One of the parents	42 (20.8)	33 (16.7)	p = 0.414
Family	13 (6.4)	9 (4.5)	
Non-Family	14 (6.9)	20 (10.1)	
Position among children			
1	57 (28.2)	78 (39.4)	$X^2 = 7.8$
2	41 (20.3)	42 (21.2)	df = 4
3	41 (20.3)	32 (16.2)	p = 0.132
4	23 (11.4)	18 (9.1)	
5 or more	40 (19.8)	28 (14.1)	
Family type			$X^2 = 12.13$
Monogamous	132 (65.3)	160 (80.8)	df = 1
Polygamous	70 (34.7)	38 (19.2)	p < 0.001

Number of wives			
1	131 (64.9)	162 (81.8)	$X^2 = 14.84$
2	52 (25.7)	25 (12.6)	df = 2
3 or more	19 (9.4)	11 (5.6)	p = 0.001
Number of children			
1	2 (1.0)	2 (1.0)	$X^2 = 15.87$
2	10 (5.0)	7 (3.5)	df = 5
3	20 (9.9)	25 (12.6)	p = 0.007
4	40 (19.8)	61 (30.8)	
5 – 9	107 (53.0)	97 (49.0)	
10 or more	23 (11.4)	6 (3.0)	
Mother’s weight			
Underweight	3 (1.5)	1 (0.5)	$X^2 = 2.32$
Normal	161 (79.7)	168 (84.8)	df = 2
Overweight/obese	38 (18.8)	29 (14.6)	p = 0.314
Father’s weight			
Underweight	2 (1.0)	0 (0.0)	$X^2 = 2.47$
Normal	182 (90.1)	184 (92.9)	df = 2
Overweight/obese	18 (8.9)	14 (7.1)	p = 0.291

* Statistically significant

Table 2 shows the family characteristics of respondents according to their school types. One hundred and thirty-three (65.8%) of those attending public schools lived with both parents while 136 (68.7%) in private schools live with their parents.

Table 3: Nutritional Rating of the Respondents using the three-day Dietary Recall (N = 400)

Nutrition Rating/18	Frequency (%)	Nutrition rating (%)
THURSDAY		
6	95	33.3 < 60
7	80	38.9 < 60
8	88	44.4 < 60
9	44	50.0 < 60
10	50	55.6 < 60
11	25	61.1 > 60
12	18	66.7 > 60
FRIDAY		
6	102	33.3 < 60
7	91	38.9 < 60
8	77	44.4 < 60
9	5	50.0 < 60
10	67	55.6 < 60
11	38	61.1 > 60

12	20	66.7 >60
SATURDAY		
6	80	33.3 < 60
7	88	38.9 < 60
8	72	44.4 < 60
9	47	50.0 < 60
10	40	55.6 < 60
11	32	61.1 >60
12	28	66.7 >60
13	13	72.2 >60

Table 3 revealed that on Thursday majority of the respondents 357 (89.25%) scored below 60% while 43 (10.75%) scored above 60%. Similarly, only 58 (14.5%) of the respondents scored above 60% on Friday while the remaining scored less than 60%. However, there was a slight improvement on Saturday with 73 (18.25%) scoring above 60%.

Table 4: Overall Nutrition rating based on three days dietary recall of respondents (healthy eating index)

Nutrition Rating	Frequency	Percentage
Thursday		
Healthy eating index	43	10.8
Unhealthy eating index	357	89.2
Friday		
Healthy eating index	58	14.5
Unhealthy eating index	342	85.5
Saturday		
Healthy eating index	73	18.3
Unhealthy eating index	327	81.7

Table 4 above revealed that majority of the respondents scored below 60% which is an indication that many of them are not eating well i.e. are not abiding by the food pyramid rules of daily recommended dietary allowances (RDAs).

Table 5: Activity Patterns of Respondents by School-Type (N = 400)

Variable	School Type		Statistics
	Public (n = 202)	Private (n = 198)	
Involved in Physical Activity enough to sweat			
Rarely/Never	60 (29.7)	40 (20.20)	$\chi^2 = 10.43$
< 3 days	44 (21.8)	33 (16.7)	df = 3
≥ 3 days	37 (18.3)	37 (18.7)	p = 0.015*
Daily	61 (30.2)	88 (44.4)	
Major Activity			

None	33 (16.3)	24 (12.1)	$X^2 = 32.20$
Walking	24 (11.9)	3 (1.5)	df = 4
Jogging/Running	74 (36.6)	81 (40.9)	p < 0.001*
Football/table tennis	71 (35.1)	76 (38.4)	
Others	0 (0.0)	14 (7.1)	

*** Statistically significant**

The activity pattern of the respondents is shown above, for both public and private schools. Of those involved in daily physical activities, 61 (30.2%) and 88 (44.4%) were from public and private schools respectively.

Table 6: Distribution of the Nutritional Status and Body image Discrepancy among Public and Private School adolescents (N = 400)

Variable	School Type		Statistics
	Public	Private	
	(n = 202)	(n = 198)	
BMI Classification (kg)			
Normal (18.5 – 24.9)	167 (82.8)	81 (40.9)	$X^2 = 25.6$
Overweight (25.0 – 29.9)	35 (17.3)	47 (23.7)	df = 2
Obese (≥ 30)	12 (5.9)	70 (35.4)	p < 0.001*
Health risk based on WHR Classification			
Low (<0.80)	32 (18.8)	14 (7.6)	$X^2 = 25.9$
Moderate (0.81-0.85)	77 (45.3)	56 (30.4)	df = 2
High (≥ 0.86)	61 (35.9)	114 (62.0)	p < 0.001*
Body Image Discrepancy			$X^2 = 1.30$
Present	145 (71.8)	152 (76.8)	df = 1
Absent	57 (28.2)	46 (23.2)	p = 0.254
It is good to be overweight			$X^2 = 0.96$
Yes	6 (3.0)	3 (1.5)	df = 1
No	196 (97.0)	195 (98.5)	p = 0.327

*** Statistically significant**

Table five shows that using Body Mass Index (BMI) classification, 167 (82.8%) of the respondents have normal weight in public school while 81 (40.9%) have normal weight in private school. Similarly, only 12 (5.9%) of the public school students were obese. On the other hand, 70 (35.4%) of the public secondary school students were obese while 47 (23.7%) were overweight. Considering the Waist Hip Ratio (WHR) classification, a greater proportion 77 (45.3%) of the public school had a moderate health risk while majority 114 (62.8%) of their counterparts in private school have high health risk. Body image discrepancy (BID) is present in both private and public secondary schools, but that of the private school was higher 152 (76.8%) than that of the public school 145 (71.8%).

Table 7: Association between Socio-Demographic Factors and BMI of Public and Private School adolescents (N = 400)

VARIABLE	BMI (%)			STATISTICS
	Normal	Overweight	Obese	
Sex				$X^2 = 29.6$
Male	131 (61.5)	32 (39.0)	33 (31.4)	df = 2
Female	82 (38.5)	50 (61.0)	72 (68.6)	p = < 0.001*
Type of school				$X^2 = 25.6$
Public	132 (62.0)	35 (42.7)	35 (33.3)	df = 2
Private	81 (38.0)	47 (57.3)	70 (66.7)	p = < 0.001*
Age groups				
< 15 years	143 (67.1)	49 (59.8)	43 (41.0)	$X^2 = 21.9$
15 – 19 years	68 (31.9)	33 (40.2)	59 (56.2)	df = 4
> 19 years	2 (0.9)	0 (0.0)	3 (2.9)	p = < 0.001*
Class categories				$X^2 = 26.8$
JSS	158 (74.2)	42 (51.2)	50 (47.6)	df = 2
SSS	55 (25.8)	40 (48.8)	55 (52.4)	p = < 0.001*
Type of family				$X^2 = 1.5$
Monogamous	151 (70.9)	64 (78.0)	77 (73.3)	df = 2
Polygamous	62 (29.1)	18 (22.0)	28 (26.7)	p = 0.461

*** Statistically Significant**

Above table showed the association between socio-demographic factors and BMI of public and private school adolescents. It shows that there is significant association between respondents sex, type of school, age group and class categories with pvalue <0.05.

Table 8: Association between Socio-Demographic Factors and BID of Public and Private School adolescents (N = 400)

Variable	Body Image Discrepancy		X ²	df	p-value
	Present	Absent			
Sex					
Male	140 (47.1)	56 (54.4)	1.6	1	0.206
Female	157 (52.9)	47 (45.6)			
Type of school					
Public	145 (48.8)	57 (55.3)	1.3	1	0.254
Private	152 (51.2)	46 (44.7)			
Age groups (in years)					
< 15	178 (59.9)	57 (55.3)	0.833	2	0.659
15 – 19	115 (38.7)	45 (43.7)			
> 19	4 (1.3)	1 (1.0)			
Class categories					
JSS	186 (62.6)	64 (62.1)	0.008	1	0.929
SSS	111 (37.4)	39 (37.9)			

Type of family					
Monogamous	216 (72.7)	76 (73.8)	0.044	1	0.835
Polygamous	81 (27.3)	27 (26.2)			

*** Statistically Significant**

Above table showed the association between Socio-Demographic Factors and BID of Public and Private School adolescents. It shows that none of the tested variable were significant with pvalue >0.05.

Table 8: Association between body mass index and BID of Public and Private School adolescents (N = 400)

Variable	Body Image Discrepancy		X ²	df	p-value
	Present	Absent			
BMI					
Normal	196(92.1)	17(7.9)	54.614	2	<0.001*
Overweight	45(54.9)	37(45.1)			
Obese	56(53.3)	49(46.7)			

*** Statistically Significant**

Above table showed the association between body mass index and BID of Public and Private School adolescents. It shows that there was significant relationship with p value <0.05.

DISCUSSIONS

Overweight and obesity are becoming emerging problems in segments of sub-Saharan African society, while the problem of under-nutrition is far from being over (Adeomi, Adeoye, & Bamidele, 2014). Adeomi et al, 2014 reported rapidly increasing prevalence of overweight and obesity among children in developing countries, (Adeomi et al, 2014) and other scattered studies have corroborated this finding (Muhihi, et al., 2012). This rising epidemic along with the persistence of under-nutrition typifies the ‘Double Burden of Malnutrition’ (DBM), (Sikorski, et al, 2014) which is becoming of great concern for African countries (Akinpelu, Oyewole, & Oritogun, 2018). In this regard, the nutritional status of children and adolescents in the developing countries needs to be continually reviewed, not only for the improvement of health of children in the coming generation, but also for the overall development of the concerned region in the near future (Goon et al., 2011).

Majority of the respondents were within the adolescents age range, as classified by the World Health organization during their 2012 summate (WHO, 2012).

The significant association between the school type and many of the socio-demographic characteristics of respondents underscores the fact that they are from different socio-economic backgrounds with the students from private schools being significantly from monogamous family settings, as compared to the polygamous settings. The families of the students from private schools also significantly had fewer wives and fewer children. This clearly illustrates that the adolescents attending private schools were from richer and more enlightened homes on average when compared with their colleagues from public schools.

The nutritional rating of the respondents showed that 1 out of 10 on first day, a little more that 1 out of 10 on the second day and less than a fifth for the third day had a healthy eating index (Ojofeitimi et al, 2011). More than four fifths of the respondents had unhealthy eating index, on each of the three days. This low level of healthy eating index and invariably a high unhealthy eating index among these students is a cause

for concern. This may be related to the socio-economic status because reports by previous authors have all highlighted the relationship between nutritional status and socio-economic factors (Adeomi et al, 2014; Sabageh et al., 2013; WHO, 2012). Nutritional status is attributable to a range of factors closely linked to overall standards of living and the ability of populations to meet their basic needs, such as access to food, housing and health care (Adeomi et al, 2014). Assessment of growth not only serves as a means of evaluating the health and nutritional status of children, but also provides an excellent measurement of the inequalities in human development faced by populations (Adeomi et al, 2014). There is therefore need for a comprehensive nutrition education for students, and this could be incorporated into the school curriculum.

Concerning the pattern of physical activities of the respondents, the students attending public schools live more active lifestyles than their private counterparts. This is similar to the finding of Kennedy, et al, 2016) which showed that, half of the school children studied did not engage in regular physical activities. This may not be difficult to understand in view of the higher socioeconomic status of the students attending private schools and the higher possession of cars and televisions sets by their parents, which all hold the potential of making children live more inactive lifestyles. Health education on the importance of active lifestyles is therefore a necessity in both school settings, but especially in the private schools.

Concerning BMI, WHR, and BID, few of the public school students were above the normal (18.5-24.9kg) BMI correspondingly, while one-third of the private secondary schools students were also above normal (18.5-24.9kg) BMI. Using Waist Hip Ratio majority of the private school were obese, while only one third of their private school colleague were obese. As shown above, BMI is an indicator of generalised weight, WHR measures more of abdominal or central obesity. Thus, BMI alone cannot be used to classify individuals, but other methods like WHR can be used in identifying cases of obesity as it is more sensitive than BMI. This was the same observations in Ojofeitimi et al in which WHOR classify higher percentage of adult respondents to manifest higher body weight than BMI (Ojofeitimi et al, 2011).

Body image discrepancy (BID) is high in both private and public secondary schools, but that of the private school was higher 76.8% than that of the public school 71.8%. Hence, it can be deduced that presents of Body image discrepancy among adolescents seems to be rising in Nigeria especially among the high socio-economic class while under-nutrition is still a big nutritional problem in the country. There is need for more investment in nutrition education and government legislation to control the eating of unhealthy food types.

The nutritional status of the respondents was significantly associated with the age, sex and class categories of the respondents such that those who were older, females and those in the senior secondary schools were more likely to be overweight/obese compared to the others. Different studies have similarly reported the association between nutritional status and age (Adeomi et al., 2015; Ojofeitimi EO et al., 2011). The significant association between nutritional status and gender has also been corroborated by previous studies (Sabageh et al., 2013).

In this study, nearly three-quarters of the respondents had body image discrepancies. Adolescents are often conscious of their body shapes and sizes. This may account for the high rate of body image discrepancies found among them. This level of body image discrepancies is similar, but even higher than what was reported by Sabageh, Ogunfowokan and Ojofeitimi in Ile-Ife where they found 61% of the respondents having body image discrepancies (Sabageh et al., 2013). All these are clear justifications for the integration of nutrition education into the school curriculum off students especially at the secondary level.

CONCLUSION

Based on findings from this study, there was a significant difference in the socio-economic status of the students in public and private schools ($p < 0.05$). There was also a significant difference in the activity patterns of the respondents ($p = 0.015$) such that respondents from public schools lived more active

lifestyles that those attending private schools. The nutritional rating of the respondents showed that greater percentage of the students had unhealthy eating index. This high level of unhealthy eating index may be responsible for the high prevalence of overweight and obesity among the respondents.

The prevalence of overweight and obesity in the study were 20.5% and 26.35 respectively. The prevalence of overweight and obesity was higher in private schools (23.7% and 35.4% respectively) than in public schools (17.3% and 17.3% respectively). Factors significantly associated with the nutritional status of the respondents ($p < 0.05$) were their age, gender, the type of schools and their class categories. Nearly three-quarters of the respondents had body image discrepancies, but there was no significant difference in the level of body image discrepancies between the students attending public and private schools.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are hereby made to the concerned authorities:

To Health Care Workers

Health education should be given to in-school adolescents on importance and benefits of adequate nutrition, with emphasis on the adolescents attending private schools.

There should be active surveillance on nutrition related diseases among adolescents by the health workers.

To Governments

Aside the attention given to primary schools, a comprehensive school health programme, with emphasis on good nutrition is recommended for all secondary schools.

It is recommended that nutrition should be included in the secondary school curriculum as a compulsory subject.

Governmental and non-governmental organizations need to invest more in nutrition education, especially as it relates to secondary school students.

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