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Prevalence of Overweight and Obesity in Nigerian Children

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ABSTRACT Overweight and obesity in childhood and youth have undesirable physical and psycho-sociological consequences and therefore need periodic surveillance. One thousand two hundred and twenty-nine school children, ages 9-13 years in Ado-Ekiti, Southwest Nigeria participated in the study. Height, weight, BMI, systolic and diastolic blood pressure (BP) were determined using the protocols of ISAK and AHA. Overall, the prevalence of overweight and obesity for boys and girls in the younger age category (9-11 years) were 1.5 percent and 1.1 percent, respectively. Corresponding data for adolescent boys and girls (12-13 years) were 0.9 percent and 1.2 percent respectively. BMI positively correlated with stature (r = 0.77; $p < 0.01$), diastolic BP (r = 0.300; $p < 0.01$), systolic BP (r = 0.44; $p < 0.01$), age (r = 0.14; $p < 0.01$), and body mass (r = 0.21; $p < 0.01$). The regression analysis showed that age and body weight accounted for 48.2 percent of the variance in the children's body mass index ($R^2 = 0.484$, $F_{(2, 1228)} = 573.075$, $p = 0.000$). Prevalence of overweight and obesity among Nigerian children and adolescents, and its association with elevated blood pressure necessitate the implementation of appropriate preventive intervention strategies including healthy eating and regular participation in school- and community-based physical activity programmes.

INTRODUCTION

Obesity has become a major public health concern in both developed and developing nations. Obesity could be understood as an accumulation of excessive fat overtime, thus constituting severe health problems (Niehues et al. 2014; Rossouw et al. 2012). Overweight and obesity are significantly associated with health problems such as breast cancer, asthma, diabetes mellitus, hypertension, coronary artery disease, attention deficit, hyperactivity disorder and occupational injuries (He et al. 2014). Overweight and obesity during youth also have undesirable physical and psycho-social consequences on well-being (Rossouw et al. 2012).

It has been reported that the menace of childhood overweight and obesity is on the increase in African countries (Rossouw et al. 2012). Many African countries are undergoing economic, technological and nutrition transitions, which have caused marked lifestyle changes characterised by physical inactivity, overweight and obesity (Pangani et al. 2016). It is also known that antecedents of obesity originate from childhood and progress into adulthood (Musa et al. 2012), which suggest the need for immediate prevention and management of the disease (Pangani et al. 2016).

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In Nigeria, overweight and obesity in children and adolescents have become a growing health problem. However, estimates of prevalence rates of overweight and obesity among Nigerian youths are inadequate due to lack of representative data from different parts of the country (Musa et al. 2012). Similar to other developing African nations, especially sub-Saharan Africa, Nigeria is presently undergoing the double-burden of nutrition transition in which under and over nutrition co-exist within the same population (Ejike 2014). This could have negative consequences for any economy that is looking forward to becoming industrialised so as to prosper (Ejike 2014).

A number of studies have reported high prevalence of overweight and obesity in Nigerian children and adolescents (Ajayi et al. 2015; Goon et al. 2011; Goon et al. 2010). Despite the results of such studies, it is necessary to periodically examine the current estimates of obesity in the various regions of the country, especially in the absence of nationally representative samples.

Previous studies have reported that the teaching of Physical Education has declined in many countries (UNESCO 2013; Kohl III and Cook 2013; Ng and Popkin 2012). This undesirable trend could seriously limit children's opportunity to be physically active as most of their weekdays are spent in school. In Ado-Ekiti, for example, like many other cities in Nigeria, limited time is allocated for the teaching of physical education and the situation is exacerbated by the appalling state of equipment and facilities, as well as poorly trained teachers. As children have limited opportunity to participate in school physical education, it is thought that they would be vulnerable to being overweight and obese. Therefore, this study primarily assessed the prevalence of overweight and obesity among 9-13 years old school children in Ado-Ekiti, Southwest, Nigeria. A secondary purpose of the study was to examine the relationship between the children's anthropometric (age, body mass, stature), and physiological (SBP and DBP) variables, and body mass index (BMI). The study also assessed the predictors of BMI among the children.

METHODOLOGY

Research Design and Sample

A cross-sectional research design was used to collect data on body composition and blood pressure from 1229 (boys n = 483; girls n = 746) school children aged 9-13 years who were randomly selected from 5 public Primary Schools in Ado-Ekiti, Ekiti State, Nigeria. The learners' ages were verified from school registers. For feasibility of data analysis the participants were categorised as children (ages 9-11 years) and adolescents (ages 12-13 years).

Ethical Considerations

Authorisation to administer the study was obtained from the children's parents, school authorities and Ekiti State Ministry of Education. Initial distribution of information leaflet about the study was performed, followed by explanation of the purpose and procedure of the study to the school children and their parents. A written informed consent was afterwards obtained from the children's parents or guardians. The children also gave verbal assent to participate in the study, which was carried out based on the ethical principles of Helsinki declaration for research involving human participants (World Medical Association 2013).

Measurements

Anthropometry

The protocols of the International Standard for the Advancement of Kinanthropometry (ISAK) were used to assess the participants' height and body weight (Marfell-Jones et al. 2006).

Defining Weight Categories

BMI was determined by dividing the participants' body weight (kg) by the square of their height (m): [body weight (kg) /height (m) ^{2}]. Therefore, BMI defined as kg/m^2, offers a reasonable measure of fatness in children. In order to screen the school children at risk of obesity, their BMI was subsequently classified as underweight, overweight or obese for age and gender (Cole et al. 2007) using the age- and sex specific BMI cut-off point recommended by the Childhood Obesity Working Group of the International Obesity Task Force (COWG/IOTF). The IOTF cut-off points are widely acceptable and have been used as a global standard for age- and gender-specific norm of BMI classifications to categorise overweight and obesity in youths

aged 2-18 years old (Valerio et al. 2013). The recommended BMI cut-off point is also related to the adult cut-off point of 25 and 30 kgm^2 to determine the risk for excessive body weight and obesity among children and adolescents aged 2-18 years.

Blood Pressure Measurements

Blood pressure (BP) was measured using electronic blood pressure monitor (Omron HEM-705 CP devices, Tokyo, Japan). The standardised guidelines of American Heart Association (2017) were applied for the assessment of BP among the children. Elevated BP was defined as the mean systolic blood pressure (SBP) and the diastolic blood pressures (DBP) above 95th percentile for age and gender after adjusting for weight and height (Cooper 2000). Based on these guidelines, the last two readings were used to calculate the mean for systolic (SBP) and diastolic (DBP), respectively. The average of the two BP measurements was used to examine incidence of hypertension associated with obesity among the Nigerian children.

Pilot Test

In other to clarify the scientific handling principles of the assessment, a pilot study was performed. This was followed by a seminar administered by two professionals experienced in kinanthropometry as well as chiildhood and adolescent physiology. The seminar aimed at ensuring competency of the field workers during the data collection.

Statistical Analysis

Mean and standard deviation were calculated for body weight, height, BMI, systolic and diastolic blood pressures across age and gender categories. Differences in the body weight, height, BMI, SBP and DBP were evaluated for boys and girls according to age group using an independent samples t-test. In order to compare differences in the prevalence of overweight, obesity and hypertensive children, BMI based on IOTF indices and BP 95th percentile for age, gender and height frequencies were computed. Bivariate analysis was performed to examine if significant relationships existed between BMI and anthropometric, and physiological variables using Spearman *rho* correlation. Multiple regression analysis was also undertaken to determine significant predictors of BMI among the school children. All data analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 24.0 (SPSS Inc. 2016), and probability level was set at $p \leq 0.05$.

RESULTS

The anthropometric, body composition and physiological characteristics of the Nigerian children are shown in Table 1. The result showed that boys and girls were not significantly different in body mass (34.4 and 31.6 kg), stature (138.3 and 133.6 cm), BMI (17.8 and 17.3kg m^{-2}), and SBP (104.1 and 93.7 mmHg), but significantly differed in DBP (65.0 and 57.0 mmHg) at age nine years, respectively ($p<0.05$). Similarly, among the 10 years old, boys and girls were not significantly different in body mass (32.5 and 31.6 kg), stature (138.2 and 136.7 cm), BMI (17.0 and 16.0kg m^{-2}), SBP (99.1 and 95.7 mmHg), but there was substantial discrepancy in DBP (61.6 and 56.7 mmHg), respectively ($p<0.05$). Age-related significant difference was observed only in stature in favour of the 11 year-old boys (143.9 cm) compared to girls (141.1 cm), but there were no significant differences in body mass (36.4 kg), BMI (17.4kg m^{-2}), SBP (102.1 mmHg) and DBP (59.4 mmHg) compared to girls of the same age group ($p<0.05$).

Mean values for body mass (39.6 kg), stature (146.1 cm), BMI (18.6 kg.m^{-2}), SBP (108.6 mmHg), and DBP (63.9 mmHg) were significantly higher in boys among age 12 years old compared to the girls (body mass: 36.3 kg; stature: 143.9 cm; BMI: 17.5 kg. m^{-2}; SBP: 99.9 mmHg; and DBP: 57.9 mmHg) of same age group ($p<0.05$). Among the thirteen years olds, there was no significant difference between boys and girls regarding their body weight (40.4 and 39.1 kg) and stature (147.8 and 148.0 cm), but boys had significantly higher BMI mean values (18.4 kg m^{-2}), SBP (106.8 mmHg) and DBP (64.0 mmHg) compared to the corresponding mean values of BMI (17.7 kg m^{-2}), SBP (102.6 mmHg) and DBP (60.1 mmHg) noted for girls of the same age category ($p<0.05$).

Anthropometric characteristics and weight status of the Nigerian boys and girls categor-

Table 1: Physical characteristics according to age groups and gender

Age	Boys (n)	Girls (n)	Body mass (kg) Total Mean (SD)	Body mass (kg) Boys Mean (SD)	Body mass (kg) Girls Mean (SD)	P	Stature (cm) Total Mean (SD)	Stature (cm) Boys Mean (SD)	Stature (cm) Girls Mean (SD)	P	BMI (kg m^{-2}) Total Mean (SD)	BMI (kg m^{-2}) Boys Mean (SD)	BMI (kg m^{-2}) Girls Mean (SD)	P	SBP (mmHg) Total Mean (SD)	SBP (mmHg) Boys Mean (SD)	SBP (mmHg) Girls Mean (SD)	P	DBP (mmHg) Total Mean (SD)	DBP (mmHg) Boys Mean (SD)	DBP (mmHg) Girls Mean (SD)	P
9	13	15	32.9 (8.7)	34.4 (8.4)	31.6 (9.1)	0.41	135.8 (8.4)	138.3 (7.8)	133.6 (8.5)	0.14	17.6 (2.9)	17.8 (3.5)	17.3 (2.4)	0.69	98.5 (18.2)	104.1 (17.6)	93.7 (17.8)	0.13	60.7 (10.8)	65.0 (7.3)	57.0 (12.2)	0.04*
10	56	77	31.9 (5.8)	32.5 (6.3)	31.6 (5.3)	0.98	137.3 (7.4)	138.2 (8.0)	136.7 (6.9)	0.26	16.9 (2.6)	17.0 (3.4)	16.8 (1.9)	0.7	97.1 (13.2)	99.1 (13.7)	95.7 (12.7)	0.14	58.7 (10.7)	61.6 (9.9)	56.7 (10.8)	0.007*
11	126	165	36.0 (7.4)	36.4 (8.4)	35.7 (6.6)	0.41	142.3 (8.8)	143.9 (9.0)	141.1 (8.5)	0.007*	17.7 (3.1)	17.4 (3.2)	17.9 (3.1)	0.26	101.5 (14.9)	102.1 (13.7)	101.0 (15.8)	0.51	59.7 (10.9)	59.4 (11.2)	60.0 (10.7)	0.64
12	168	244	37.6 (7.5)	39.6 (7.6)	36.3 (7.0)	<0.001*	144.8 (9.7)	146.1 (9.9)	143.9 (9.5)	0.02*	18.0 (3.8)	18.6 (3.9)	17.5 (3.7)	0.005*	103.4 (16.4)	108.6 (14.5)	99.9 (16.7)	<0.001*	60.4 (11.8)	63.9 (11.4)	57.9 (11.5)	<0.001*
13	120	245	39.5 (7.1)	40.4 (7.5)	39.1 (6.8)	0.12	147.9 (8.3)	147.8 (8.3)	148.0 (8.3)	0.84	18.0 (2.4)	18.4 (3.0)	17.7 (2.1)	0.03*	104.6 (15.5)	108.6 (15.8)	102.6 (15.0)	0.001*	61.4 (11.7)	64.0 (11.9)	60.1 (11.5)	0.03*

*Statistically significant ($p < 0.05$)
BMI: Body Mass Index; kg: Kilograms; kg m^{-2}: Kilograms per square meter; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; mmHg: Millimetres of Mercury

ised by age: 9-11 years (children) and 12-13 years (adolescents) are provided in Table 2. In the younger age (9-11 years) group, participants were significantly different only in stature (p = 0.002) with the boys being taller on average. Based on the total number of the children in this cohort, 75.9 percent were underweight, 21.4 percent had normal weight, and 1.5 percent were overweight, while 1.1 percent were obese. In contrast, the adolescent group showed significant differences in five variables which include age (p = 0.02), body mass (p < 0.001), BMI (p < 0.001), SBP (p < 0.001), and DBP (p < 0.001). In this group, 0.9 percent had BMI greater than 24.9 kg m^{-2}, 1.1 percent were obese, and 30.4 percent had normal BMI value, while 67.6 percent were underweight.

In the younger age (9-11 years) group, there was a high prevalence of overweight among girls compared to boys, while obesity was prevalent among boys. In contrast, in the older age (12-13 years) group, overweight and obesity was more prevalent among boys compared to girls of the same age group. When the data on overweight and obesity prevalence were combined separately for children and adolescents (Table 3), the prevalence rates were found to be higher (2.6%) among the children compared to adolescents (2.1%).

Table 4 presents the results on the prevalence of overweight and obesity stratified by age and sex using the IOTF criteria. The trend in BMI data for younger boys was not consistent, because among age 10 years old, there was a decrease, but the mean BMI was higher among age 11-12 years old. Thereafter, a decrease was noted among age 13 years old. Similarly, between the ages of 9-11 years, inconsistency in the distribution of data was observable in girls, but among age 12 and 13 years old, there was a distinctive trend in which BMI increased with age. The prevalence of overweight and obesity tends to be inconsistently higher among the adolescents boys (12-13 years old) compared to girls of the same age group. This was also not consistent among the children in the 9-11 years old age group.

Table 5 shows the Spearman's *rho* bivariate correlation concerning the relationship between the BMI, and anthropometric and physiological measures. Body mass index was significantly and positively correlated with stature (r = 0.77; $p < 0.01$), DBP (r = 0.300; $p < 0.01$), SBP (r = 0.44; p

Table 2: Anthropometric characteristics and weight status (Mean ± SD) of participants (n = 1229)

Variable	*Children (n = 452)*				*Adolescents (n = 777)*			
	Boys (n = 195)	*Girls (n = 257)*	*t-value*	*p-value*	*Boys (n = 288)*	*Girls (n = 489)*	*t-value*	*p-value*
Age (yr)	10.5± 0.61	10.5± 0.60	-0.07	0.94	12.4± 0.49	12.5± 0.50	-2.28	0.02
Stature (cm)	141.9± 9.04	139.4± 8.43	3.06	0.002	146.8± 9.37	146.0± 9.14	1.24	0.21
Body mass (kg)	35.1± 8.04	34.2± 6.71	1.31	0.19	39.9± 7.62	37.7± 7.12	4.05	<0.001
BMI (kg/m^2)	17.3± 3.29	17.5± 2.81	-0.58	0.55	18.5± 3.55	17.6± 3.06	3.52	<0.001
Systolic BP (mmHg)	101.4± 14.0	99.0±15.3	1.74	0.08	108.6±15.0	101.3±15.9	6.40	<0.001
Diastolic BP (mmHg)	60.4± 10.7	58.8±10.9	1.54	0.12	64.0±11.6	59.0±11.5	5.75	<0.001
Underweight (%)	33.2	42.7			22.0	45.6		
Normal (%)	8.8	12.6			13.9	16.5		
Overweight (%)	0.4	1.1			0.5	0.4		
Obese (%)	0.7	0.4			0.6	0.5		

BMI: Body Mass Index; kg: Kilogram; cm: Centimetre; yr: Year; BP: Blood Pressure; n: Number; %: Percent

< 0.01), age (r = 0.14; $p < 0.01$), and body mass (r = 0.21; $p < 0.01$). There was a statistically significant relationship between the participants' age and body mass (r = 0.38; $p < 0.01$), stature (r = 0.33; $p < 0.01$), SBP (r = 0.14; $p < 0.01$), and DBP (r = 0.070; $p < 0.05$). Stature was also found to be significantly positively correlated with DBP (r = 0.33; $p < 0.01$), SBP (r = 0.52; $p < 0.01$), and age (r = 0.33; $p < 0.01$).

The Univariate analysis performed to examine the variables from the model that could significantly predict BMI among the participants showed that overall; age, body weight, SBP and DBP significantly predicted BMI (β = -0.131; p = 0.000, β = 0.724; p = 0.000, β = 0.020; p = 0.465, β = -0.035; p = 0.169). In the backward regression, 3 possible models were generated. Model 3 with age and body weight variables, was the best of all possible models, since it had the highest value of adjusted R^2 which represents the amount of variance (48.2%) in the BMI predicted models (R^2 =0.484, $F_{(2, 1228)}$ = 573.075, p = 0.000) (Table 6).

DISCUSSION

In this cross sectional study, the researchers examined overweight and obesity prevalence and the relationship between anthropometric (age, body mass, stature) and physiological (SBP and DBP) variables, and the BMI, as well as BMI predictors among school children in Southwest Nigeria. Increasing prevalence of overweight and obesity in children and adolescents has become a public health concern, both in the high, and middle to low income nations. The global findings on prevalence of overweight and obesity altogether showed an increase of 47.1 percent for children between 1980 and 2013 (Ng et al. 2013). From ages 2-19 years, industrialised nations revealed a significant rise in occurrence with 23.8 percent of boys and 22.6 percent of girls being reported to be either overweight or obese in 2013, compared to 16.9 percent of boys and 16.2 percent of girls in 1980 (Ng et al. 2013). In unindustrialized nations, the increase in overweight and obesity was from 8.1 percent in 1980 to 12.9 percent in 2013 for boys and 8.4 percent to 13.4 percent in girls (Ng et al. 2013). It is important to note that there were small, but significant gender differences regarding obesity prevalence estimates between these periods in both technologically advanced and technologically emerging nations (Ng et al. 2013). There-

Table 3: Prevalence of overweight and obesity combined among participants (n = 1229)

Group	*N*	*Overweight (%)*	*Obese (%)*	*Total (%)*
Children	452	7 (1.5)	5 (1.1)	12 (2.6)
Adolescents	777	7 (0.9)	9 (1.2)	16 (2.1)
Total	1229	14 (2.4)	14 (2.3)	28 (4.7)

n: Number; %: Percent

Table 4: Prevalence of overweight and obesity stratified by age and sex using the IOTF criteria

	Boys (n=483)					*Girls (n= 746)*				
	BMI					*BMI*				
Age (yr)	*N*	*M*	*SD*	*% OW*	*% Obese*	*N*	*M*	*SD*	*% OW*	*% Obese*
9	13	17.8	3.58	0.5	0.0	15	17.3	2.45	0.0	0.0
10	56	17.0	3.45	0.5	0.5	77	16.8	1.93	0.0	0.0
11	126	17.4	3.20	0.0	1.0	165	17.9	3.12	1.9	0.8
Total	195	17.3	3.29	1.0	1.5	257	17.5	2.81	1.9	0.8
12	168	18.6	3.90	1.0	1.4	244	17.5	3.75	0.4	0.6
13	120	18.4	3.00	0.4	0.3	245	17.7	2.17	0.2	0.2
Total	288	18.5	3.55	1.4	1.7	489	17.6	3.06	0.6	0.8

M: Mean; SD: Standard Deviation; %: Percent; BMI: Body Mass Index; IOTF: International Obesity Task Force; yr: Year; N: Number; OW: Overweight

Table 5: Spearman's *rho* correlation matrix showing relationship between BMI and anthropometric and physiological variables (n=1229)

Variables	*Age*	*Body mass*	*Stature*	*BMI*	*SBP*	*DBP*
Age (yr)	1					
Body mass (kg)	0.38**	1				
	0.000	.				
Stature (m)	0.33**	0.74**	1			
	0.000	0.000	.			
BMI (kg/m^2)	**0.14****	**0.21****	**0.77****	1		
	0.000	0.000	0.000	.		
SBP (mmHg)	0.14**	0.35**	0.52**	**0.44****	1	
	0.000	0.000	0.000	0.000	.	
DBP (mmHg)	0.07*	0.22**	0.33**	**0.30****	0.60**	1
	0.015	0.000	0.000	0.000	0.000	.

**Correlation is significant at the 0.01 level (2-tailed)*
**Correlation is significant at the 0.05 level (2-tailed)*
BMI: Body Mass Index; kg: Kilograms; kg/m^{-2}: Kilograms per Square Meter; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; mmhg: Millimetres of Mercury; cm: Centimetre; yr: Year

fore, understanding the trends of overweight and obesity could assist in detecting children at risk of the undesirable health consequences related to overweight and obesity (Skinner et al. 2015).

Nigeria is a developing country where overweight and obesity have become probable health worries (Adegoke et al. 2008). Furthermore, studies on obesity among the youth are still limited (Niehues et al. 2014; Goon et al. 2012), thereby restraining a more decisive declaration on the prevalence of overweight and obesity (Niehues et al. 2014), which are believed to be on the increase in Nigeria.

The prevalence of overweight and obesity in this study showed that overall the boys and girls in the younger age group had higher values compared to older ones. However, this tendency was more prevalent among the younger girls than the boys. Musa et al. (2012) reported

Table 6: Multiple linear regression analyses to examine the best variables from the model that predicts BMI

Model	R^2	*Independent variables*	*Standardized beta*	*p-value*	*F*
1	0.484	Age	-0.131	0.000	286.986 **
		Body mass	0.724	0.000	
		Systolic BP	0.020	0.465	
		Diastolic BP	-0.035	0.169	
2		Age	-0.131	0.000	328.616*
		Body mass	0.731	0.000	
		Diastolic	-0.025	0.244	
3		Age	-0.130	**0.000**	573.075 *
		Body mass	0.723	**0.000**	

*p< 0.05; **p< 0.01

similar findings in which high prevalence of overweight and obesity was observed among younger children in Benue State of Nigeria. Conversely, the prevalence rates of combined overweight and obesity for children (19.7% and 23.2%), and adolescent (11.4% and 11.6%) boys and girls reported by Musa et al. (2012) were higher than those observed in the researchers' study. Studies have also reported high prevalence of overweight and obesity among the youth in Nigeria (Ajayi et al. 2015; Musa et al. 2012) and elsewhere (Pangani et al. 2016; Niehues et al. 2014; Ahrens et al. 2014; Mosha and Fungo 2010). The reported findings can be explained in the context of geographical location which have a role to play in the prevalence of overweight and obesity among the children and youths (Rossouw et al. 2012).

When the data on obesity and overweight for boys and girls were compared, overweight was found to be higher in girls, while obesity was more prevalent in boys in the younger age group. Furthermore, adolescent boys had higher levels of overweight and obesity compared to the girls in the same age category. This finding was supported by He et al. (2014) who also reported the prevalence of overweight to be higher in boys compared to girls. The prevalence of overweight and obesity, as well as its associated chronic diseases of lifestyle have negative public health impact (Musa et al. 2012) and require strategic initiatives to stem the rising tendency.

With regard to the relationship between BMI, SBP and DBP, the researchers' study indicates significantly positive correlations between BMI, and both SBP and DBP among the participants. Substantial positive correlations were also found between BMI and age, stature and body mass. However, the relationship between BMI and age was not strong according to the interpretation of Dancey and Reidy (2004) strength of association. This finding corroborates those of Gonzales et al. (2016) who assessed the correlation between the BMI, age and serum adrenal androgen levels in Peruvian children living at high altitude and at sea level. Gonzales et al. (2016) found that there was a correlation between the BMI and age among the children. Kim et al. (2012) also found a positive association between BMI and body mass.

Measurement of blood pressure and anthropometric parameters such as BMI is crucial for evaluating the health of the youth (Dua et al. 2014). Several other studies have also reported the BMI to be significantly correlated with both systolic and diastolic blood pressures (Behjati et al. 2015; Dua et al. 2014; Aliyu et al. 2014; Souza et al. 2010). The backward regression analysis in the researchers' study showed that age and body mass most significantly predicted the participants' BMI.

LIMITATIONS

The results of this study should be interpreted based on a number of limitations: First, the participants were not categorised in terms of their physical activity level and it was also not feasible to assess their dietary intake. Second, the study was carried out on a sample of learners in a town in Southwest Nigeria, which limits its generalisability to the rest of the country. In spite of these constraints, the study provides useful information that could guide future research assessing obesity and body weight disorders in Nigerian children.

CONCLUSION

Despite that the prevalence of overweight and obesity is not as high compared to what was reported in the previous studies on Nigeri-

an children and adolescents, there is a need to appropriately stem and reverse the worrying prevalence rates that are expected to increase, and consequently avoid untimely morbidity and mortality.

RECOMMENDATIONS

Preventive public health interventions such as adopting physically active lifestyles and wholesome dietary habits are urgently needed to address these concerns. In addition, parents, teachers or guardians of children both in and outside the school should be involved in educating the children in order to understand the negative effects of obesity.

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