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RESEARCH

Obesity and associated factors in young adults attending tertiary institutions in south-eastern Nigeria

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Objective: To assess prevalence of overweight/obesity and associated factors in a group of university undergraduates in south-east Nigeria.
Design: Cross-sectional survey.
Setting: Five tertiary institutions in south-east Nigeria.
Methods: A total of 1610 undergraduates were selected using multistage sampling. A validated questionnaire on socio-demographic, dietary and lifestyle factors was used. Variables studied included body mass index (BMI), waist:hip ratio (WHR) and blood pressure (BP). Descriptive statistics and Chi square test were used for data analyses.
Results: Prevalence of obesity and overweight were 6.5% [4.2% males; 8.4% females ($p < 0.05$)] and 13.4% [8.4% males; 17.7% females ($p < 0.05$)], respectively. A higher prevalence of central obesity and abdominal obesity was found in the females (15.7% and 27.2%, respectively) compared to the males (1.1% and 2.4%, respectively) ($p < 0.05$). Consumption of unhealthy snack foods ($X^2 = 13.39$), being a female ($X^2 = 47.91$), first year student ($X^2 = 41.82$), and having high systolic ($X^2 = 88.18$) and diastolic ($X^2 = 10.17$) BP were associated with obesity ($p < 0.05$).
Conclusions: Prevalence of obesity was high in the studied population and, if left unchecked, portends deleterious consequences, especially with respect to the development of cardiovascular diseases.

Keywords: association, obesity, overweight, socio-demographic factors, young adults

Introduction

In Africa, despite the high prevalence of under nutrition, the prevalence of overweight and obesity is increasing at an alarming rate.[1] With the risk of the double burden of malnutrition, there is a need to target prevention in developing countries. Children and young adults who are obese are more likely to have a clustering of cardiovascular risk factors such as dyslipidaemia, hypertension and type-2 diabetes mellitus, which persist into adulthood.[2,3] Some studies have related the lifestyle of youths to risk factors for overweight and obesity. These include smoking, alcoholism, commuting to school by car/taxi, being from a rich family, as well as excess energy consumption.[4,5] All over the world, the prevalence of overweight and obesity has been on the increase.[1] Among university students in developing countries, the prevalence of overweight/obesity is reported to be 10–20.7% in Nigeria,[6,7] 10.8–24% in South Africa,[8,9] 11–37.5% in India[10,11] and 20–30% in Malaysia.[12,13]

At present, there are limited data from the south-eastern region of Nigeria on the magnitude of overweight and obesity and their associated risk factors among young adults, and this represents a significant gap in knowledge. Generally young adults are often presumed healthy and are therefore rarely the subjects of obesity research (as opposed to children, adolescents and the elderly).[7] Overweight/obesity in young adults, if left unchecked, will constitute future risks for associated non-communicable diseases. This study therefore determined the prevalence of overweight and obesity and associated risk factors in young adults enrolled in tertiary institutions in south-east Nigeria. The findings hopefully will help provide data for programs that target primary prevention of obesity and its comorbid conditions in Nigeria.

Methods

Study design and sample size determination

A cross-sectional study was conducted in five randomly selected tertiary institutions in the south-eastern states of Nigeria (Imo, Abia, Enugu, Ebonyi and Anambra states). The institutions are Ebonyi State University, Abakaliki, Imo State University, Owerri, University of Nigeria, Nsukka, Michael Okpara University of Agriculture, Umudike, and Anambra State University, Uli. Young adults (i.e. students attending these institutions of higher learning) between the ages of 18 and 30 years who gave informed consent and were willing to participate in the study were recruited. Exclusion criteria included pregnancy or lactation in women, presence of any form of physical disability and suffering from any form of chronic illness. The study was approved by the Ethics Committee of the Federal Medical Centre, Umuahia.

Sample size was calculated using the Araoye[14] formula as follows:

$$N = \frac{z^2 \times P\,(100 - p)}{x^2}$$

where N = sample size; z = confidence level (which was taken as 95% with a degree of probability of 1.96%, approximated to 2%); P = prevalence of overweight among young adults, taken as 25%;[1] 100 – p = percentage of young adults not overweight; and, x^2 = level of precision, taken to be 5%.

An estimated sample size of 300 was obtained. This figure (300) was used for each of the five selected institutions to obtain a total sample size of 1 500. Ten percent was added to this figure to make up for drop outs.

Sampling technique

A multistage sampling procedure was used to select participants for the study. In the first stage, a list of the public (government-owned) tertiary institutions in each of the selected states was made and this formed the sampling frame. Five schools in the sampling frame were selected by simple random sampling. In the second stage, participants from each of the five selected tertiary institutions were stratified according to their different colleges or faculties and from each strata, random sampling was carried out to obtain the total number of subjects from each school (i.e. 300 each) who met the eligibility criteria. Those who were chosen during sampling but were not willing to participate in the study were removed and sampling continued till the desired total number of subjects was obtained.

Data collection

Data collection was by means of a structured questionnaire designed to obtain information on the socio-demographic characteristics (such as sex, age, and monthly allowance), dietary habits and lifestyle pattern (such as number of meals, unhealthy snack foods and soft drinks consumed daily, weekly alcohol consumption, and physical activity pattern) of the subjects. The questionnaire was submitted to nutritionists, in the Department of Human Nutrition and Dietetics, Michael Okpara University of Agriculture, Umudike, to validate its content. The face-validated questionnaire was pre-tested in another tertiary institution in Abia State, not included in the final analysis. Research assistants were trained on questionnaire administration, anthropometric measurement techniques, blood pressure measurements and data entry.

Anthropometric measurements

Anthropometric measurements of height, weight, waist and hip circumference were taken using appropriate standard procedures.[15] Body weight was measured using a calibrated portable scale (HANA brand) with a maximum capacity of 120 kg. The respondents removed their shoes and heavy clothing prior to weighing, and weight was taken to the nearest 0.1 kg.[15]

Height measurements were taken using a calibrated measuring rod. The respondents were in a upright standing position, eyes looking straight forward, and arms by the sides and without shoes. Measurements were taken to the nearest 0.1 cm.[15] Information collected on anthropometric measurements of weight and height was used to determine the body mass index (BMI) and categorised thus: BMI < 18.5 kg/m^2 = underweight, BMI ≥ 18.5–24.99 kg/m^2 = normal, BMI ≥ 25–29.99 kg/m^2 = overweight, while BMI ≥ 30 kg/m^2 = obese.[15]

Measurements for waist circumference (WC) were taken using a non-elastic fiber glass tape. The tape was snugly placed in a horizontal plane (parallel to the floor) around the abdomen, at the midpoint between the top of the iliac crest (just below the navel) and the lower margin of the last palpable rib in the mid-axillary line.[1,16] The respondents were at the point of measurement, standing upright and had their arms relaxed at the side while their feet were evenly spread apart to ensure body weight was evenly distributed. Hip circumference (HC) measurements were also taken using a non-elastic fiber glass tape snugly placed at the largest circumference of the buttocks. Measurements were taken to the nearest 0.1 cm.[15] Waist:hip ratio (WHR) was calculated and used as an indicator of central obesity. A WHR of > 1.0 in the males and > 0.85 in females was used to determine those at risk of central obesity[15] and subjects with a waist circumference of > 102 cm for males and > 88 cm for females were considered at risk of abdominal obesity.[16–18]

Blood pressure measurement

Blood pressure (BP) measurements were taken, on a single visit, using an oscillometric device (Omron 7050 model) as described by Lee and Niemen.[19] For each subject, three BP measurements were taken after an initial ten-minute rest in a seated position, and at five-minute intervals between readings. The cuff (typically 12 × 22 cm in small adults and 16 × 30 or 36 in the others, depending on arm circumference) was wrapped around each respondent's upper arm with the lower edge remaining approximately one inch above the arm crease, at the level of the heart while sitting down. Blood pressure readings were recorded in millimeters of mercury (mmHg) for systolic BP (SBP) and diastolic BP (DBP). The first readings were discarded and the mean of the last two readings recorded per subject. BP classifications were based on that given by the American Heart Association.[20] Subjects with SBP/DBP values of 120/80 or greater were described as having elevated blood pressures.

Statistical analysis

Information obtained from the respondents were analysed using the Statistical Product and Service Solutions (SPSS) software version 17.0 (SPSS Inc., Chicago, USA). The results obtained were presented as percentages, frequencies and means (SD). Student's t test was used to determine if differences between continuous data for male and female respondents were significant. Chi square (χ^2) test of association was used to identify the factors associated with the prevalence of overweight and obesity. A p value of less than 0.05 was accepted as statistically significant.

Results

Data from a total of 1610 young adults were analysed for this study. Table 1 depicts the general characteristics of the young adults. About half of the respondents were within the age range of 18–22 years (51.9%) and this was significantly higher than the proportion of the other age groups ($p < 0.001$). The monthly income of respondents was between N5,000 – N10,000 (approximately USD28 – USD53 at the time of the study) for 34.9% of the respondents. There were no significant differences observed for monthly allowance and educational level of students ($p = 0.705$).

The results for anthropometric and BP measurements (Table 2), show that males had significantly higher weight (67.7 ± 9.1 kg), height (1.7 ± 0.1 m), WHR (0.9 ± 0.1), SBP (121 ± 16 mmHg) and DBP (77 ± 11 mmHg) than females ($p < 0.05$), while females had significantly higher BMI (23.3 ± 3.9 kg/m^2), WC (80.8 ± 8.7 cm) and HC (95.5 ± 8.8 cm) than males ($p < 0.05$).

The prevalence of overweight/obesity based on BMI stratified by gender in Table 3 indicates that 13.4% and 6.5% of the studied population were overweight and obese, respectively. There was a significant difference between subjects who had normal BMI

Table 1: General characteristics of the young adults based on gender

Parameter	Males (*n* = 742) F (%)	Females (*n* = 868) F (%)	Total (*n* = 1610) F (%)	χ^2; *p* value
Age (years)				
18–22	347 (46.8)	482 (55.5)	829 (51.9)	12.79; 0.001*
22–25	287 (38.7)	289 (33.3)	576 (35.8)	
25–30	108 (14.6)	97 (11.2)	205 (12.7)	
Level in school				
100 Level	242 (32.6)	280 (32.3)	522 (32.4)	1.292; 0.936
200 Level	168 (22.6)	185 (21.3)	353 (21.9)	
300 Level	177 (23.9)	219 (25.2)	396 (24.6)	
400 Level	80 (10.8)	97 (11.2)	177 (11.0)	
500 Level	75 (10.1)	87 (10.0)	162 (10.1)	
Monthly allowance				
<N5,000	206 (27.8)	242 (27.9)	448 (27.8)	2.13; 0.705
N5,000-N10,000	261 (35.2)	301 (34.7)	562 (34.9)	
N10,001-N15,000	110 (14.8)	114 (13.1)	224 (13.9)	
N15,001-N20,000	75 (10.1)	88 (10.1)	163 (10.1)	
>N20,000	90 (12.1)	123 (14.2)	213 (13.2)	

*Significantly different, N represents unit of currency in Naira, figures in parentheses represent percentages, F represent frequency counts.

Table 2: Mean anthropometry and blood pressures of the young adults based on gender

Anthropometric measurements	Male (Mean ± SD)	Female (Mean ± SD)	*p* value
Weight (cm)	67.7 ± 9.1	63.9 ± 11.2	<0.001*
Height (m)	1.7 ± 0.1	1.7 ± 0.1	<0.020*
Triceps (mm)	15.9 ± 6.8	21.7 ± 8.6	<0.001*
BMI (kg/m^2)	22.2 ± 2.7	23.3 ± 3.9	<0.001*
Waist circumference (cm)	79.8 ± 7.4	80.8 ± 8.7	<0.011*
Hip circumference (cm)	93.0 ± 8.6	95.5 ± 8.8	<0.001*
WHR	0.9 ± 0.1	0.8 ± 0.1	<0.001*
Systolic BP (mmHg)	121 ± 16	118 ± 37	0.0280*
Diastolic BP (mmHg)	78 ± 11	75 ± 11	<0.001*

*Significantly different between males and females in various anthropometric measurements, BMI = body mass index, BP = blood pressure, WHR = waist hip ratio, SD = standard deviation.

and their obese counterparts in both sexes ($p = 0.000$). WHR and WC classification showed that most of the participants were safe from central and abdominal obesity.

The association of BMI with socio-demographic characteristics showed the prevalence of overweight and obesity was significantly higher in females than males ($p < 0.001$). Obesity and underweight prevalence were significantly higher among first-year students ($p < 0.001$) (Table 4).

In all the weight categories, most participants consumed unhealthy snack foods more than three times a week (Table 5).

Table 3: Prevalence of overweight/obesity using different anthropometric indices among the young adults

Variables	Males (*n* = 742) F (%)	Females (*n* = 868) F (%)	Total (*n* = 1610) F (%)	χ^2; *p* value
BMI categories				
Underweight	42 (5.7%)	52 (6.0%)	94 (5.8%)	47.914; 0.000*
Normal	607 (81.8%)	589 (67.9%)	1196 (74.3%)	
Overweight	62 (8.4%)	154 (17.7%)	216 (13.4%)	
Obese	31 (4.2%)	73 (8.4%)	104 (6.5%)	
WHR				
Safe	734 (98.9%)	732 (84.3%)	1466 (91.1%)	104.56; 0.000*
At risk	8 (1.1%)	136 (15.7%)	144 (8.9%)	
WC				
Safe	724 (97.6%)	632 (72.8%)	1356 (84.2%)	333.047; 0.000*
At risk	18 (2.4%)	236 (27.2%)	254 (15.8%)	

*Significantly different between males and females based on obesity indicators assessed, WHR = waist hip ratio, WC = waist circumference, BMI = body mass index, F = frequency counts, figures in parentheses represent percentages.

The consumption of unhealthy snack foods was however significantly higher only among obese participants ($p = 0.037$) compared to their normal weight counterparts. As much as 58.1% of the study participants reported consuming unhealthy snack foods more than three times a week. Table 6 shows that nearly two-thirds (59.6%) of obese participants presented with elevated systolic pressure ($p < 0.05$), while about the same proportion of the underweight and normal weight participants presented with normal systolic blood pressure. More than two-thirds (65.7%) of obese participants presented with elevated diastolic pressure ($p < 0.05$), while close to two-thirds of the underweight and normal weight participants presented with normal diastolic blood pressure. Engaging in up to 30 min of exercise daily was not significantly associated with obesity ($p > 0.05$) (Table 6).

Discussion

Excess body fat is well documented as a risk factor for numerous chronic conditions, such as diabetes, hypertension, hyperlipidaemia and CVDs.[21] In this study, BMI was used as a measure of general obesity, while WHR and WC, which are better predictors of cardiovascular risks, non-insulin dependent diabetes, hypertension, etc., were used to assess central/abdominal obesity.[22–24] Results of this study showed the prevalence of overweight and obesity is rising in this population group and thus does not bode well for the burden of non-communicable diseases linked to obesity. This study shows the prevalence of obesity to be 6.5%, a value within the range (5–10%) reported by one study in Nigeria.[6] The figure is however higher than the 1.3% and 3% recorded for undergraduates in two different universities in Nigeria[7,25] but consistent with the 6.0% and 9.8% recorded in cross-sectional surveys of a group of Nigerian and Ghanaian undergraduates, respectively.[26,27] A higher prevalence (10.8–24%) has been reported for South African undergraduates.[8,9] The prevalence of central obesity (8.9%) obtained in this study was lower than 20% reported in a university in Nigeria,[24] but consistent with 9.8% obtained for Ghanaian undergraduates.[27]

Table 4: Association of BMI with socio-demographic characteristics of the young adults

Variables	Body mass index (BMI)					χ^2; *p* value
	Underweight (*n* = 94) F (%)	Normal (*n* = 1196) F (%)	Overweight (*n* = 216) F (%)	Obesity (*n* = 104) F (%)	Total (*n* = 1610) F (%)	
Sex						
Male	42 (44.7)	607 (50.8)	62 (28.7)	31 (29.8)	742 (46.1)	47.91; 0.000*
Female	52 (55.3)	589 (49.2)	154 (71.3)	73 (70.2)	868 (53.9)	
Level in school						
100 level	43 (45.7)	393 (32.9)	51 (23.6)	35 (33.7)	522 (32.4)	
200 level	21 (22.3)	264 (22.1)	54 (25.0)	14 (13.5)	353 (21.9)	41.82; 0.000*
300 level	19 (20.2)	292 (24.4)	57 (26.4)	28 (26.9)	396 (24.6)	
400 level	8 (8.5)	120 (10.0)	26 (12.0)	23 (22.1)	177 (11.0)	
500 level	3 (3.2)	127 (10.6)	28 (12.9)	4 (3.8)	162 (10.1)	
Monthly allowance						
≤N10,000	61 (64.9)	751 (62.8)	132 (61.1)	66 (63.5)	1010 (62.7)	15.68; 0.206ns
N10,001-N20,000	20 (21.3)	296 (24.7)	50 (23.1)	21 (20.2)	387 (24.1)	
> N20,000	13 (13.8)	149 (12.5)	34 (15.7)	17 (16.3)	213 (13.2)	

*Significantly different between body mass index categories and socio-demographic characteristics, ns = not significantly different between body mass index categories and socio-demographic characteristics, figures in parentheses represent percentages.

Table 5: Association of BMI with dietary factors in young adults

Variables	Body mass index (BMI)					χ^2; *p* value
	Underweight (*n* = 94) F (%)	Normal (*n* = 1196) F (%)	Overweight (*n* = 216) F (%)	Obesity (*n* = 104) F (%)	Total (*n* = 1610) F (%)	
Number of meals						
One	0 (0.0)	25 (2.1)	7 (3.2)	2 (1.9)	34 (2.1)	13.02; 0.162ns
Two	27 (28.7)	371 (31.0)	87 (40.3)	32 (30.8)	517 (32.1)	
Three	56 (59.6)	689 (57.6)	102 (47.2)	59 (56.7)	906 (56.3)	
>Three	11 (11.7)	111 (9.3)	20 (9.3)	11 (10.6)	153 (9.5)	
Total	94 (100)	1196 (100)	216 (100)	104 (100)	1610 (100)	
Consumption of unhealthy snack foods						
≤3 times/week	34 (36.2)	411 (34.4)	82 (38.0)	33 (31.7)	560 (34.8)	13.398; 0.037*
≥3 times/week	54 (57.4)	686 (57.4)	130 (60.2)	66 (63.5)	936 (58.1)	
Not at all	6 (6.4)	99 (8.3)	4 (1.9)	5 (4.8)	114 (7.1)	
Total	94 (100)	1196 (100)	216 (100)	104 (100)	1610 (100)	
Soft drink consumption						
≤3 times/week	17 (18.1)	280 (23.4)	62 (28.7)	27 (26.0)	386 (24.0)	9.464; 0.149ns
≥3 times/week	67 (71.3)	754 (63.0)	133 (61.6)	69 (66.3)	1023 (63.5)	
Not at all	10 (10.6)	162 (13.5)	21 (9.7)	8 (7.7)	201 (12.5)	
Weekly alcohol consumption						
Yes	40 (42.6)	591 (49.4)	99 (45.8)	57 (54.8)	787 (48.9)	3.908; 0.272ns
No	54 (57.4)	605 (50.6)	117 (54.2)	47 (45.2)	823 (51.1)	

*Significantly different between body mass index categories and dietary factors studied, ns = not significantly different between body mass index categories and dietary factors studied, figures in parentheses represent percentages.

The findings from this study show that females were significantly more overweight and obese than their male counterparts ($p < 0.05$) using BMI, WC and WHR classification. This female preponderance of overweight/obesity is consistent with findings from most studies of young adults.[4,7,9,25] The higher obesity rates in females may be attributed to gender differences whereby females accumulate more fat than their male counterparts. Furthermore, other researchers noted that cultural norms in Africa predispose more women to increased body weight since being fat is associated with beauty, affluence and evidence of good living and health.[7] It was reported that a gradual build-up of body weight at early adulthood could increase the chances of young adults becoming obese with advancement in age.[25] In fact, about 50% of obese children grow up to become obese adults, as against only 10% of normal weight children who grow up to become obese adults.[28]

Table 6: Association of BMI with lifestyle characteristics of young adults

Variables	Body mass index (BMI)					χ^2; *p* value
	Underweight (*n* = 94) F (%)	Normal (*n* = 1196) F (%)	Overweight (*n* = 216) F (%)	Obesity (*n* = 104) F (%)	Total (*n* = 1610) F (%)	
≥30 min of exercise daily						
Yes	58 (61.7)	728 (60.9)	126 (58.3)	50 (48.1)	962 (59.8)	6.845; 0.077ns
No	36 (38.3)	468 (39.1)	90 (41.7)	54 (51.9)	648 (40.2)	
SBP						
Hypotension	5 (5.3)	86 (7.2)	16 (7.4)	3 (2.9)	110 (6.8)	88.18; 0.000*
Normal	58 (61.7)	673 (56.3)	111 (51.4)	39 (37.5)	881 (54.7)	
Elevated BP	31 (32.9)	373 (36.5)	89 (41.2)	62 (59.6)	619 (38.4)	
DBP						
Hypotension	6 (6.4)	76 (6.4)	9 (4.2)	1 (0.9)	92 (5.7)	10.17; 0.000*
Normal	54 (57.5)	671 (56.1)	120 (55.6)	36 (34.6)	881 (54.7)	
Elevated BP	34 (36.2)	449 (37.5)	87 (40.3)	67 (65.7)	637 (39.6)	

*Significantly different between body mass index categories and lifestyle variables studied, ns = not significantly different between body mass index categories and lifestyle variables studied, figures in parentheses represent percentages.

The result further show that consumption of unhealthy snack foods more than three times a week was associated with weight gain. The literature has been consistent on the association between consumption of high-energy nutrient-poor foods and body weight gain.[29–33] It has been reported that the consumption of snacks and junk foods high in fat and sugars constitutes a risk factor for obesity and cardiovascular diseases.[33,34] With the increasing number of fast-food "joints" on campuses and a high frequency of undergraduates "eating out",[28] an increase in the risk of non-communicable diseases appears inevitable. The recent nutrition transition in developing countries from traditional fiber-rich diets to "western-styled" fast-foods has been reported to affect the dietary habits of young adults, such as students of universities and other tertiary institutions.[35] A survey of undergraduates in Ogun State (south-west Nigeria) revealed that over 70% consumed snacks regularly[35] and this was higher than the 58.1% found in this study.

It was interesting to note in this study that first-year students had a significantly higher prevalence of obesity and underweight than their other counterparts. This indicates the existence of double burden of malnutrition, a situation where there is co-occurrence of under nutrition and over-nutrition in specific groups. The young adulthood coincides with the period when adolescents complete their secondary education and join higher institutions of learning. This period is also associated with significant lifestyle changes some of which are beneficial and others deleterious to health and thus represents an important time for laying strong primary prevention interventions for public health problems such as overweight and obesity. Poor dietary habit is reported to be a major public health problem when young adults transit to the university.[36] Similarly, lack of knowledge of healthy food choices is known to negatively influence eating habits and nutritional status of university students.[37] It is also possible that the rigors of academic work help students lose weight after their first year in the university. Clearly, this apparent "obese freshman syndrome" deserves further studies.

Physical activity which is a modifiable risk factor for obesity and its co-morbidities[38] was low as more than one third (40.2%) did not engage in daily exercise for up to 30 min. The results show a higher proportion of overweight and obese students who were not involved in regular physical exercise though this was not significant ($p > 0.05$). It is also possible that the higher rates of overweight and obesity observed in females compared to males could be a result of the females being more sedentary than their male counterparts. Females have been reported to be more susceptible to excess weight gain because they were less likely to engage in regular physical exercise and partly due to lack of facilities that are gender sensitive.[4] Alcohol consumption was high as 48.9% reported consuming one form of alcohol or the other within the week. Though, alcohol consumption was higher in obese students (54.8%), the difference in proportion was however not statistically significant ($p > 0.05$). In this study, we found that obese subjects were more likely to have elevated blood pressure relative to normal weight subjects. The significant relationship between elevated blood pressures and obesity is consistent with previous reports.[39,40] The high prevalence of elevated blood pressures reported here may be due to the fact that blood pressures were measured only on a single visit and using an oscillometric device, rather than measurements on three separate visits using the auscultation protocol which is the gold standard method for assessing blood pressures.[20] This limitation is nonetheless common with cross-sectional studies performed in environments where resources and expertise are limited.[40]

Conclusion

The findings in this study show the prevalence of overweight and obesity to be high in this population group (relative to other reports from similar populations in Nigeria) and if left unchecked portend deleterious consequences, especially with respect to the development of the obesity sequelae. The findings of this study therefore warrant that nutrition education programs be emphasised in tertiary institutions to curb the rising trend in overweight and obesity among this age group. This could be achieved by adding such programs into the general studies curriculum offered in most Nigerian universities. Though the males in this study had lower obesity risk, nutrition education strategies should nonetheless focus on both sexes since existing research regarding overweight/obesity across all age groups show a rising trend in its prevalence irrespective of sex. There is the need to educate young adults in tertiary institutions on good eating habits since they normally eat away from home, thereby consuming energy-dense and high sodium foods, which have been implicated in the etiology of obesity and other cardiovascular diseases.

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