Dietary Behaviour, Knowledge and Perception of Undergraduate students towards Obesity in a Nigerian University

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ABSTRACT

Background: *A steadily increasing trend of obesity among young adults is becoming evident, and this could lead to an increased burden of chronic non-communicable diseases in adulthood.*

Objective: *This study assessed the knowledge of undergraduate students on obesity and its related conditions, their perception and dietary behaviour.*

Method: *A total of 394 undergraduate students of Obafemi Awolowo University, Ile-Ife, Nigeria, were recruited using a multistage sampling technique. A self-administered questionnaire with four sections; socio-demographics, knowledge of obesity, perception and dietary behaviour was used to collect data. The correct response to each question was scored 1 and 0 for an incorrect. Participants' were graded as good or positive if they score above the median for each section. A Chi-square test was done to assess the relationship between categorical variables. The statistical significance level was set at p < 0.05.*

Results: *Majority (64.0%) had poor knowledge of obesity and were mostly males (54.0%), and 58.4% had a positive perception of obesity and were mostly females (62.1%). Also, 57.6% had poor dietary behaviour and were mostly males (58.8%). The daily consumption of fruits (8%) and vegetables (4.1%) were low among participants. A statistically significant relationship (X2= 10.546; p=0.001) was found between obesity knowledge and perception. There was no statistically significant relationship between obesity knowledge and dietary behaviour.*

Conclusion: *Most undergraduate students in the studied population had poor knowledge of obesity and poor dietary behaviour. Therefore, public health interventions to prevent obesity among university students should focus on improving their knowledge and dietary behaviour.*

Keywords: Obesity knowledge, Perception, Dietary behavior

INTRODUCTION

Obesity is a condition of abnormal accumulation of fat in the adipose tissue, to the extent that health may be impaired [1,2]. It is measured with body mass index greater than or equals to $30kg/m^2$. Overweight and Obesity contribute to numerous chronic non-communicable diseases (NCDs) worldwide [3]. Worldwide about 650 million adults, 340 million adolescents and 39 million children are obese. This number is still increasing. WHO estimates that additional 167

million people- mostly adults and children will become less healthy because of overweight or obesity –[4]. The consequences of obesity have been documented extensively in connection with cardiovascular diseases, type II diabetes mellitus, dyslipidemia, and certain types of cancers, such as the hormonal-related (breast, ovarian, endometrial, and prostate), liver and large-bowel cancers, and gallbladder disease. Also, the non-fatal but debilitating health problems associated with obesity include respiratory difficulties, chronic musculoskeletal problems, skin problems and infertility. [5]. Although, obesity and overweight were once considered problems of high-income countries, a rapid increase in obesity rates have also been documented in the developing world [6]. Until recently, the report shows that a steadily increasing trend of obesity among young adults is becoming evident ————[7,8].

The contributing factors to obesity include age, gender, ethnicity, culture, food habits, lifestyle, and lack of physical activity [9,10]. The increased supply of processed food, rapid urbanization and changing lifestyles has led to a shift in dietary patterns leading to the global burden of obesity [11]. Furthermore, studies revealed that university students had a low daily intake of fruits and vegetables [12,13], frequently engage in snacking habits [14] and had a higher frequency of fast food consumption [15], thereby promoting dietary behaviour that can lead to unintended weight gain. Adequate knowledge and awareness of the consequences of obesity through public enlightenment program has been reported to be capable of lessening the prevalence of chronic non-communicable diseases (NCDs). Although there were many studies targeting the undergraduates' pattern of nutrition, their knowledge and perception of obesity as the major risk factor for NCDs have not been fully explored [2,16].Therefore, it is of utmost importance to assess how much undergraduates know about obesity and its related conditions, their perception of it and the influence of their knowledge on their dietary behavior.

METHODS

Setting and Study design

This descriptive cross-sectional survey was conducted at Obafemi Awolowo University, Ile-Ife, Nigeria. It is a public university situated on a vast expanse of land totaling 11,681 hectares in Ile-Ife, Osun State, Southwest, Nigeria. The university was founded in 1961, and offers undergraduate and postgraduate degree programmes in multiple fields of study ranging from humanities, the arts, natural sciences, engineering, technology and medical sciences, with a student population of about thirty-five thousand. The campus is built on about 5,000 acres ($20km^2$) and comprises of academic, administrative units, service centres and residential areas. The student residential area is made up of 10 undergraduate hostels and a postgraduate hall of residence. The academic area is not too far from the residential area. Many restaurants and fast food joints are located there.

Participants

Undergraduate students of Obafemi Awolowo University in the chosen departments and who gave consent to participate in the study were recruited into the study.

Sample size determination

The sample size was calculated using Leslie Fischer's formula for a single population proportion $[n=Z^2p(1-p)/d^2]$. The prevalence of university students with good knowledge of obesity was 49.8% from a previous study[17], with a 95% CI and precision of 5%. After accounting for a non-response rate of 10, the total sample size was rounded up to 423.

Sampling technique

Multi-stage sampling technique was used in selecting participants. In the first stage, out of twelve faculties, the Clinical Sciences, Basic Medical Sciences, and Dentistry were excluded based on the assumption that they might have been exposed to relevant teachings on obesity. Out of the remaining nine Faculties that met the inclusion criteria, five Faculties were selected

using the simple random technique (balloting method). These were Faculties of Law, Administration, Education, Social sciences and Arts. In the second stage, three departments were selected in each of the five faculties by simple random technique (balloting method) except the Faculty of Law, which has only one department. This gives a total of 12 departments and the Faculty of Law. The third stage involves recruiting 30 participants from each of the 12 chosen departments and 63 from the Faculty of Law using a simple random sampling technique (balloting method).

Ethical clearance
Ethical clearance was sorted and obtained from the Institute of Research and Ethical Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife. Written informed consent was taken from each selected respondent.

Data collection tools and technique
A structured self-administered questionnaire which had four sections; socio-demographics, knowledge of obesity, perception and dietary behaviour was used to collect data. The questionnaire contained 11 questions to assess the respondent's knowledge of obesity, 16 questions to assess the perception of obesity, and dietary behaviour was assessed using frequency of consumption of certain food groups. The questions on obesity knowledge and perception were adapted from previously published research work "–––[1820]. The questionnaires were pretested among 40 undergraduate students in the Faculties of Environmental Design and Management, and Agriculture and all ambiguous questions were re-worded.

Measurement of Variables
Dietary behaviour
The frequency of consumption of seven food groups; fruit, vegetable, fried foods, sweets, fatty snacks, soft drinks, and barbecue/*Suya* in the study location and are likely to lead to excessive weight gain if consumed too often were assessed. The frequencies of consumption of these foods per week (once/week, 1-2 times/week, 3-4 times/week, 5-6 times/week and every day) were constructed based on previous studies –––––[21,22]. Intake of healthy foods, including fruit and vegetables, was dichotomized to less than 5 times/week (unacceptable) and more than 5 times/week (acceptable). While intake of unhealthy food, including sugary drinks, fatty snacks, fried foods and barbecue were dichotomized to 2 times/week or less (acceptable) and more than 2 times/week (unacceptable)[23]. The total obtainable score ranged from 0-7 points. A score below the median score (4 points) was classified as poor dietary behaviour.

Obesity knowledge
The questions assessed the respondent's awareness, sources of information, basic knowledge and assessment method of obesity. The 11 questions were scored 1 for correct response and incorrect response 0 with the score range between 0-20 points. A score greater than the median score (10 points) was graded good knowledge.

Perception of obesity
The perception questions were measured with a 4-point Likert scale. For every positive question, strongly agree (SA) carries the highest mark and a reverse score for every negative question. The total obtainable score ranged between 16-64 points. A score below the median score was classified as negative and above as positive.

Data analysis
Data analysis was done by means of SPSS version 25. At Univariate level, descriptive statistics was done to analyze descriptive data and the results are presented as frequencies and percentages for categorical variables and as means and standard deviations for continuous variables. Knowledge, perception and dietary behaviour scores were computed with +1 for a correct response and 0 for an incorrect response. These scores were graded as good or poor knowledge, positive and negative perception, good and poor dietary behaviour using median scores as the cut-offs. Bivariate chi-square test was done to assess the relationships between knowledge of obesity, perception and

dietary behaviour. The statistical significance level was set at p< 0.05.

RESULTS
Socio-demographic characteristics of the study participants
Out of 423 questionnaires that were administered, 394 were accurately filled and subjected to analysis after sorting and cleaning. This gave a response rate of 93.1%. The mean age of the respondents was 20.25 ± 2.7 years and were mostly females (53.0%). Majority of the respondents were single (96.7%), were of Yoruba tribe (88.1%) and were Christians (85.8%). Most of the participants do not have more than 4 siblings (72.1%) and maintained the first 3 positions (73.6%) among siblings. Respondents' parents were educated (father 70.8%, mother 62.7%) and were mostly self-employed (father 47.5%, mother 52.5%). Majority (91.7%) of the students received 20,000 naira and below as monthly stipends and were mostly 200 level (49.7%) students (Table 1).

Respondents' knowledge of obesity
Among 394 respondents interviewed, 94.7% have heard about obesity. The two common sources of information were media (55.0%) and books (42.1%). Majority of the respondents did not know that the cause of obesity is multi-factorial (71.8%), is associated with serious health conditions (92.5%) and can affect both sexes (50.5%). In terms of obesity assessment, only 34.3% have heard about body mass index (BMI). Among those who have heard of BMI, 84.4% knew what it stands for, 40.6% knew the healthy range and majority (75.8%) have not checked their BMI in the last three months. The aggregate score showed that majority (64.0%) of the respondents have poor knowledge of obesity and were mostly males (54.0%) (Table 2)

Respondents' perception of obesity
Out of 373 respondents that have heard about obesity, majority agreed that it can be addressed medically (85.5%) and should not be viewed as a sign of good living (90.1%). Majority also agreed that dietary modification (87.1%), reduction in salt intake (84.0%) and being physically active (82.6%) can help to prevent obesity. However, some disagreed with the statements that obesity is a disease (27.3%) and can lead to stigmatization (28.1%). About 24% also agreed that obesity makes one looks mature. The aggregate score showed that majority (58.4%) of the respondents have a positive perception of obesity and were mostly females (62.1%) (Table 3).

Dietary behaviour of the respondents
The proportion of students who consumed fruits every day was 8.0% and less than 5% consumed vegetable every day. These foods were mostly consumed by females. The proportion of respondents who consumed fried foods (51.2%), snacks (52.5%) and candies (52.5%) everyday were higher in females. The proportion of respondents who consumed sugary drinks every day were higher in males (61.5%). The aggregate score showed that majority (57.6%) of the respondents have poor dietary behaviour and were mostly the males (58.8%) (Table 4).

Relationship between obesity knowledge, perception and dietary behaviour of respondents
Table 5 showed that there was a statistically significant relationship between obesity knowledge and perception of obesity by the respondents. A higher proportion of students with good knowledge also had a positive perception of obesity (X^2= 10.546; p=0.001). There is no statistically significant relationship between obesity knowledge and dietary behaviour of respondents (X^2= 0.690; p= 0.450). However, a higher proportion of respondents with poor dietary behaviour also had poor knowledge.

Table 1: Socio-demographic Characteristics of Respondents

Variable	Frequency (N)	Percentage (%)
Age (yrs.)		
<20	182	46.2
>20	212	53.8
Mean ±SD	20.25 ± 2.7	
Sex		
Female	209	53.0
Male	185	47.0
Ethnicity		
Yoruba	347	88.1
Others	47	11.9
Religion		
Christianity	338	85.8
Islam	56	14.2
Marital Status		
Single	381	96.7
Married	13	3.3
Number of Siblings		
4& below	284	72.1
5 & above	110	27.9
Position in the Family		
1st -3rd	290	73.6
4th& above	104	26.4
Father's Level of Education		
No formal	22	5.6
Primary	24	6.1
Secondary	65	16.5
Tertiary	279	70.8
Mother's Level of Education		
No formal	24	6.1
Primary	24	6.1
Secondary	95	24.1
Tertiary	247	62.7
Father's Occupation		
Self employed	187	47.5
Trader	29	7.4
Retired	45	11.4
Civil Servant	131	33.7
Mother's Occupation		
Self employed	207	52.5
Trader	23	5.8
Retired	15	3.8
Civil Servant	147	37.9
Current Level		
100	62	15.7
200	196	49.7
300	79	20.1
400	57	14.5
Monthly Stipends (n=386)		
20,000 and Below	354	91.7
Above 20,000	32	8.3
Total	394	100

Table 2: Knowledge of obesity of the respondents

Obesity variable	Yes n(%)	No n(%)
Heard of obesity *(n=394)*	373 (94.7)	21 (5.3)
Male *(n=185)*	170 (91.9)	15 (8.1)
Female *(n=209)*	203 (97.1)	6 (2.9)
Source of information*(n=373)*	**Frequency**	**Percentage**
Books	157	42.1
Media	205	55.0
Lectures	99	26.5
Friends	109	29.2
Health workers	98	26.3
Internet	104	27.9
General knowledge*(n=373)*	Correct response	Incorrect response
Obesity refers to being excessively fat or overweight	354 (94.9)	19 (5.1)
Obesity is linked to multiple factors	105 (28.2)	268 (71.8)
Obesity is associated with serious health conditions	28 (7.5)	345 (92.5)
Obesity is a chronic disease	255 (68.4)	118 (31.6)
Obesity can affect all sexes	185 (49.5)	188 (50.5)
Obesity is linked to sedentary lifestyles	308 (82.6)	65 (17.4)
Obesity assessment		
Heard of BMI	128 (34.3)	245 (65.7)
Meaning of BMI *(n=128)*	108 (84.4)	20 (15.6)
Normal BMI range	52 (40.6)	76 (59.4)
Checked BMI in the last 3months	31 (24.2)	97 (75.8)
Grouping of obesity knowledge	Frequency	Percentage
Good knowledge	142	36.0
Poor knowledge	252	64.0
Obesity knowledge by gender	Good knowledge	Poor knowledge
Male	49 (34.5)	136 (54.0)
Female	93 (65.5)	116 (46.0)

Table 3: Perception of obesity by the respondents

Perception of obesity	SA	A	D	SD
	n (%)	n (%)	n (%)	n (%)
Obesity is a disease	142 (38.1)	129 (34.6)	69 (18.5)	33 (8.8)
It can lead to stigmatization	100 (26.8)	168 (45.1)	49 (13.1)	56 (15.0)
Obesity can be treated medically	116 (31.1)	203 (54.4)	39 (10.5)	15 (4.0)
An obese individual should see a doctor	168 (45.0)	167 (44.8)	21 (5.6)	17 (4.6)
Dietary modification can prevent it	153 (41.0)	172 (46.1)	23 (6.2)	25 (6.7)
Reducing daily salt intake is good	108 (29.0)	205 (55.0)	42 (11.3)	18 (4.8)
Eating junks between meals can lead to obesity	110 (29.5)	184 (49.3)	62 (16.6)	17 (4.6)
Physical inactivity increases the chance of being obese	139 (37.3)	169 (45.3)	42 (11.3)	23 (6.1)
Obesity is an evidence of good living	15 (4.0)	22 (5.9)	110 (29.5)	226 (60.6)
Enhances appearance	26 (7.0)	45 (12.1)	116 (31.1)	186 (49.9)
Confers respect	17 (4.6)	32 (8.6)	127 (34.0)	197 (52.8)
Measure socioeconomic status	19 (5.1)	45 (12.1)	142 (38.1)	167 (44.8)
It makes one look mature	18 (4.8)	69 (18.5)	109 (29.2)	177 (47.5)
It makes one attractive	11 (2.9)	18 (4.8)	141 (37.8)	203 (54.4)
It makes clothes to fit better	16 (4.3)	27 (7.2)	123 (33.0)	207 (55.5)
A fat student is wealthier than a slim student.	22 (5.6)	37 (9.4)	113 (28.7)	222 (56.3)

Overall Perception	Frequency	Percentage
Positive perception	218	58.4
Negative perception	155	41.6

Perception of obesity by sex	Positive Perception n (%)	Negative perception n (%)
Male	92 (42.2)	78 (50.3)
Female	126 (57.8)	77 (49.7)

SA- Strongly Agree, A- Agree, D-Disagree, SD- Strongly Disagree

Table 4: Dietary behaviour of the respondents

Variables	Male n (%)	Female n (%)	Total
Fruit			
<Once/week	71 (42.0)	98 (58.0)	169 (45.3)
1-2 times/week	55 (49.5)	56 (50.5)	111 (29.8)
3-4 times/week	27 (52.9)	24 (47.1)	51 (13.7)
5-6times/week	7 (58.3)	5 (41.7)	12 (3.2)
Everyday	10 (33.3)	20 (66.7)	30 (8.0)
Vegetable			
<Once/week	69 (44.2)	87 (55.8)	156 (41.8)
1-2 times/week	44 (41.7)	67 (58.3)	115 (30.8)
3-4 times/week	39 (57.4)	29 (42.6)	68 (18.2)
5-6times/week	7 (36.8)	12 (63.2)	19 (5.1)
Everyday	7 (46.7)	8 (53.3)	15 (4.1)
Fried foods			
<Once/week	43 (41.7)	60 (58.3)	103 (27.3)
1-2 times/week	41 (42.7)	55 (57.3)	96 (25.7)
3-4 times/week	50 (52.3)	46 (47.9)	96 (25.7)
5-6times/week	16 (43.2)	21 (56.8)	37 (10.3)
Everyday	20 (48.8)	21 (51.2)	41 (11.0)
Snacks			
<Once/week	39 (49.4)	40 (50.6)	79 (20.2)
1-2 times/week	32 (40.0)	48 (60.0)	80 (21.4)
3-4 times/week	35 (44.9)	43 (55.1)	78 (20.9)
5-6times/week	26 (44.8)	32 (55.2)	58 (15.6)
Everyday	38 (48.7)	40 (51.3)	78 (20.9)
Sweets (candies)			
<Once/week	75 (49.0)	78 (51.0)	153 (41.0)
1-2 times/week	39 (41.9)	54 (58.1)	93 (24.9)
3-4 times/week	19 (50.0)	19 (50.0)	38 (10.2)
5-6times/week	8 (28.6)	20 (71.4)	28 (7.5)
Everyday	29 (47.5)	32 (52.5)	61 (16.4)
Soft drink			
<Once/week	43 (36.4)	75 (63.6)	118 (31.6)
1-2 times/week	52 (45.6)	62 (54.4)	114 (30.6)
3-4 times/week	32 (48.5)	34 (51.5)	66 (17.7)
5-6times/week	11 (47.8)	12 (52.2.0)	23 (6.2)
Everyday	32 (61.5)	20 (38.5)	52 (13.9)
Barbecue (*suya*)			
<Once/week	83 (44.1)	105 (55.9)	188 (50.4)
1-2 times/week	31 (43.1)	41 (56.9)	72 (19.3)
3-4 times/week	18 (54.5)	15 (45.5)	33 (8.8)
5-6times/week	7 (41.2)	10 (58.8)	17 (4.6)
Everyday	31 (49.2)	32 (50.8)	63 (16.9)
Grouping of DB			
Good DB	70 (41.2)	88 (43.3)	158 (42.4)
Poor DB	100 (58.8)	115 (56.7)	215 (57.6)

DB; Dietary Behaviour

Table 5: Relationship between obesity knowledge, perception and dietary behaviour of respondents

Variables		Perception		X	P-value
		Negative	Positive		
Obesity	Poor	111 (48.1%)	120 (51.9%)	10.546	0.001
Knowledge	Good	44 (31.0%)	98 (69.0%)		
		Dietary Behaviour			
		Poor	Good		
Obesity	Poor	137 (59.3%)	94 (40.7%)	0.690	0.450
Knowledge	Good	78 (54.9%)	64 (45.1%)		

DISCUSSION

Studies have shown that obesity is increasing among young adults [8,11,24] and the link with chronic non-communicable diseases is significant –[25]. This study, therefore, assessed the knowledge of obesity and its related conditions, perceptions and dietary behaviour among non-science undergraduates of Obafemi Awolowo University, Ile-Ife.

When asked about their awareness of obesity, 373 (94.7%) claimed to have heard about it. The proportion of females reported to have heard about obesity in this study was higher and this is similar to a study in Kenya'[18]. This could be due to the fact that females generally are more conscious of their body image """[26,27]. Most (55%) of the respondents acknowledged that social media was their major source of obesity information. This contrasted the findings in the United States where most participants got their information from the school [28]. While social media could serve as a major source of information, the recency and credibility of information obtained must be critically evaluated [29,30]. More than half of the respondents do not know that obesity is associated with serious health conditions, multi-factorial and can affect both sexes. On obesity measurements, only 34.3% have heard about body mass index (BMI), less than half (40.6%) knows the healthy range and only 24.2% have checked their BMI in the last 3 months. A similar finding was also reported in

Kenya '[18]. On the aggregate, majority (64%) of the respondents have poor knowledge of obesity. This was similar to the results reported among students at Ohio [31]. However, a previous study in India reported 100% good knowledge of obesity among medical students [19]. This is not surprising as medical students are exposed to lectures on obesity and its associated factors.

On obesity perception, some still viewed obesity as evidence of good living (10%), a measure of socioeconomic status (17.2%), a sign of maturity (23.3%), makes clothes fit better (11.5%) and as a way of earning respect (13.2%). These negative perceptions have been well reported on by previous researchers among adults '[18,20]. Cumulatively, more of the respondents in this study have a positive perception of obesity. However, a good number still nurture a distorted view of obesity despite being in an academic environment. Pro-active measures, therefore, need to be taken to correct these views by creating awareness on obesity and its associated health risk. Improving the knowledge of the students by way of education would help to prevent the rise in obesity and it's attendant's health consequences among young adults in the future[32,33].

World Health Organization (WHO) experts recommended the intake of a minimum of 400g of fruits and vegetables daily for the prevention of chronic non-communicable disease [34]. This study shows that 8.0% and 4.1% consumed fruits and vegetables respectively on a daily basis. This

low prevalence of fruit and vegetable consumptions have been reported by previous researchers among young adults in Nigeria ———[35-37]. However, a higher prevalence of fruit and vegetable consumptions have been well reported on among young adults in developed countries –[22,38]. This does not come as a surprise as report already showed that for the past two decades, there has been a rapid and marked socioeconomic advancement in developed countries leading to a significant improvement in the lifestyles and dietary pattern of young adults [22,39]. In this study, more females tend to consume more fruits daily than males. This is in contrast to a higher proportion of males reported in a previous study [22]. Also, more females consumed fried foods daily. Similar results were reported by another researcher [22]. The proportion of respondents that consumed unhealthy snacks in this study is low compared to 32% reported in a previous study –[38]. The prevalence of poor dietary behaviour in this study was higher, and this must have been largely influenced by the poor knowledge of obesity reported in this study.

There was a significant relationship between knowledge of obesity and perception. This shows that good knowledge of obesity can positively influence people's perception of it and subsequently help to guide their food choices.

CONCLUSION

This study shows that undergraduate students engage in poor dietary behaviour, which could lead to overweight or obesity. Although their perception of obesity is above average, knowledge is still low. Therefore, public health interventions to address overweight or obesity among university students should focus on improving their knowledge and dietary behaviour.

CONFLICT OF INTERESTS

The authors declared that they have no conflict of interests

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