

# Knowledge of Obesity and its Implications on the Reproductive Health Outcomes of young Female Adults (19-35years) in Owo Local Government Area of Ondo State, Nigeria

\***Olanrewaju O.I**\*\***Ukegbu, P.O**, \*\*\***Dele-Olawumi Bukola**, \***Adedayo, E.O**

\*Nutrition and Dietetics Department, Rufus Giwa Polytechnic, Owo, Ondo State.

\*\*Human Nutrition and Dietetics Department, Michael Okpara University of agriculture, Umudike

\*\*\* Nutrition and Dietetics Department, College of Health Sciences and Technology, Ijero-Ekiti

\***Correspondence Author:** tunakinshealthcare@gmail.com

## **ABSTRACT**

**Background:** Obesity is a worldwide health epidemic and a major public health concern globally with negative impact on reproductive health.

**Objective:** The study assessed the Knowledge of Obesity on Reproductive Health Outcomes of young Female Adults in Owo Local Government Area of Ondo State.

**Materials and methods:** The study was a descriptive cross-sectional study which involved 500 young female's adults who were systematically sampled. A structured, self-administered questionnaire was used to source information from participants. Knowledge of Health implications (HIs) of obesity was assessed on a 9point scale. Score lower or equal ( $\leq 3$ ), was regarded as low knowledge while Score ( $\geq 4 \leq 6$ ), was regarded as average knowledge and those who score greater or equals ( $\geq 7 \leq 9$ ) are treated as excellent knowledge of HIs. Obesity was assessed using Body mass index. Data were analyzed using descriptive statistics and chi-square. A probability of  $P < 0.05$  was taken to indicate level of significance.

**Result:** Findings show that hospital, radio/television and school are the major sources of information about obesity by the respondents. The study shows that 50.2% of the participants perceived that obesity increase the risk of miscarriage, while 35.2%, irregular period, 35.2% infertility, and 42.0% cesarean section. Knowledge score of health implications of obesity revealed that only 5% had an excellent knowledge, about 62.2% had average knowledge while 32.8% had low knowledge.

**Conclusion:** Knowledge of the health implication of obesity was low among the participants. Therefore, health enlightenment programmes with emphasis on health implications of obesity for young adults is urgently needed.

**Keywords:** Obesity, Young Females, Health Implication, miscarriage

## **INTRODUCTION**

The prevalence of obesity is increasing worldwide and it has been identified as a major risk factor contributing to the overall burden of disease worldwide (1,2). This trend of emerging obesity in Nigeria population is seen more, not just in urban dwellers (3,4), but also among women (2, 5) and it strongly contributes to the increasing prevalence of non-communicable diseases which include heart disease, type 2 diabetes, hypertension,

stroke and cancers along the spectrum of life (6). Estimates of the health and social implications as well as the economic cost of the burden of obesity reflect the severity of the problem (8,9). Obesity is one of the non-communicable diseases of public health concern globally with negative impact on reproductive health (10, 11). The association between excess weight and cardio-metabolic disease is widely recognized by the medical

profession as well as the general public (11).

There is also substantial evidence that obesity plays a significant role in the development of female-specific reproductive health issues, which have a significant impact on public health (12). Obesity is associated with increased risk of breast cancer (13) and endometrial cancer (14). Obesity particularly impacts women of reproductive age, as it is associated with an increased risk of infertility (15, 16) and pregnancy complications (17, 18). An escalating epidemic of overweight and obesity is affecting many countries in the World, and if action is not taken now to stem the pandemic, millions of people will develop non communicable diseases and other health disorders (19). The rising epidemic reflects the profound changes in the society and on the behavioral patterns of communities (6). The menace of obesity among women remain one of the challenges facing the 21<sup>st</sup> century Nutritionist and health care providers because of the danger obesity pose in the female lives most especially within their reproductive age. Curbing the global obesity epidemic among women of reproductive age require an evidence based multi-sectorial, multidisciplinary and culturally relevant approach in setting appropriate health intervention programs (20). Assessment of knowledge of women on the risk factors and health implications of obesity is crucial to the success of such interventional program (21). The probability of an obese individual losing or maintaining a healthy weight may depend greatly on what he or she has heard or knows about the complications of the condition. Many researchers have reported the prevalence of obesity and overweight among different age groups including women of reproductive age in Nigeria but there is limited information on the knowledge of Obesity on Reproductive Health Outcomes. Hence, the need to investigate the knowledge of Obesity and its implications on Reproductive Health Outcomes of young Female Adults (19-35years) in Owo Local Government Area of Ondo State, Nigeria

## Materials and Method

### Study design

The study employed a descriptive cross-sectional study design.

### Study area

#### Study area

The study was carried out in Owo local government area of Ondo State, south west Nigeria. Owo was one of the first local governments created, when Ondo State was created in 1976 from the old western state. Owo was a city approximately between latitudes 7° 11' and 7° 18' and longitudes 5° 35' and 5° 58' East of the Greenwich meridian (22). It is situated in the southwestern part of Nigeria at the southern edge of the Yoruba hills (Elevation of 1,130ft (344m) and at the intersection of the road from Akure, Kabba, Benin city (22). According to 2006 national census the total population of the local government is 218,886 of which 110,429 are males, while 108,457 are females (23). Majority of the people are government workers. Christianity and Islam are generally the dominating religion practiced by the inhabitants of Owo.

### Study Population

The study population consisted of apparently healthy young female adults aged 19-35 years.

### Sample size determination

The sample size was determined using the formula for descriptive studies (24)

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

P is the proportion of the factor under investigation i.e 10% (10% represents the prevalence of obesity among adult females aged 15-49 years in Ondo state, Nigeria (25). A minimum sample size of 151 was calculated. Sample size was increased from 151 to 500.

### **Sampling procedure**

Multistage sampling method was used in the selection of the communities for the study in the local government. A total of six (6) communities were randomly selected from a total of 16 communities. Three (3) communities each were selected from the urban and three (3) from the rural communities of the local government under investigation. Systematic sampling procedure was adopted in household selection of the young females for the study.

### **Informed consent**

Prior to the survey, permission was obtained from Human Nutrition and Dietetics Department, Michael Okpara University of agriculture, Umudike. Verbal consent from the participants was obtained after the objectives of the study were explained to them.

### **Data collection**

#### **Questionnaire**

The questionnaire was pre-tested and among female post graduate students of Human Nutrition and Dietetics department, Michael Okpara University of Agriculture, Umudike before it was used to elicit information on respondent's socio-demographical characteristics, respondent's perception on body weight, and source of information about obesity. A Modified version of the questions developed by Eden *et al.* (11) on knowledge obesity and reproductive health outcome of obesity was adopted.

#### **Anthropometric measurements**

Anthropometric measurements of height and weight of the participants were taken. The standing height of participants with no shoes, were measured to the nearest 0.1 cm. Participants stood with their heels together, arms to the side, legs straight, shoulders relaxed and head in the Frankfort horizontal plane (looking straight ahead) as described by World Health Organization (26). The participants placed their heels, buttocks, scapula and the back of their head against the vertical board of the height meter while the weight of the participants were

measured using a portable bathroom scale (HANSON model), with a precision to the nearest 0.1kg was used to determine weight. Individuals wore light garment with no shoes and stood on the scale, with their body equally Distributed on both feet (26) before any participant was weighed, the bathroom scale was set to zero for validity and reliable

### **Data analysis**

Waist –Hip- Ratio (WHR) was calculated by dividing the waist circumference by the hip circumference. Respondent whose WHR was >0.85 and waist circumference >88cm were considered to be at risk of central obesity (26). Body mass index was calculated using the formula below.  $BMI (kg/m^2) = \frac{weight (kg)}{height (m^2)}$  (26).

Body Mass Index were classified as underweight BMI (<18.5), Normal within (>18.5 ≤24.99), Overweight (>25 ≤ 29.99) and Obesity BMI (>30kg/m<sup>2</sup>).

#### **Grading of knowledge of respondents on obesity**

A Modified version of knowledge grading of health implication of obesity developed by Eden *et al.*, (11) was adopted for the study. Nine (9) reproductive implications of obesity were listed for respondents to identify and each health outcome of obesity was assigned a point. Knowledge score of health implications of obesity and overweight was assessed on a 9-point scale and scored as low knowledge (≤3), average knowledge (≥4≥6) and excellent knowledge (≥7≥9).

#### **Statistical analysis**

Statistical analysis was performed using the statistical package for social science (SPSS version 20). Descriptive statistics such as frequencies, percentages, mean and standard deviation were used to analyze sources of information about overweight/obesity and all anthropometric data respectively. In all cases, a probability of (<0.05) was taken to indicate level of significance.

## Result

Table 1 expresses the socio-demographic characteristics of the study participants. A total of 500 young females within the age range of 19 – 35 years participated in the study. Nearly half (43.6%) of them were within the age of 19-23years. Urban participants (60%) who participated in this study were more than rural participants (40%). Majority of the respondents

were still single (59.8%) while only (40.2%) of them were married as at the time of data collection. About (51.8%) of the subjects were Christians. About (46.2%) of the respondents were students, (22.6%) were civil servants while 9.8% and 5.2% were artisans and traders respectively. The prevalent of unemployment was (16.6%) while more than half(66.2%) of the participants were of Yoruba extract.

**Table 1: Socio -demographic characteristics of the study participants**

Variable	Urban (n=300)	Rural (n=200)	Total samples (n= 500)	X <sup>2</sup>	p-value
<b>Age (years)</b>	<b>f (%)</b>	<b>f (%)</b>	<b>f (%)</b>		
19 -23	129(25.8)	189(17.8)	218(43.6)	0.666	0.978
21 -28	65(13.0)	44(8.8)	109(21.8)		
29 -33	72(14.4)	46(9.2)	118(23.6)		
34 -35	34(6.8)	21(4.2)	55(11.0)		
<b>Marital status</b>					
Married	121(24.2)	80(16.0)	201(40.2)	0.941	0.508
Single	179(35.8)	120(24.0)	299(59.8)		
<b>No of children</b>					
None	193(38.6)	126(25.2)	319(63.8)	0.800	0.620
1 – 2	35(7.0)	31(6.2)	66(13.2)		
3 – 4	57(11.4)	35(7.0)	92(18.4)		
5 and above	15(3.0)	8(1.6)	23(4.6)		
<b>Religion</b>					
Christianity	154(30.8)	105(21.0)	259(51.8)	0.656	0.858
Islam	97(19.4)	66(13.2)	163(32.6)		
Traditional	49(9.8)	29(5.8)	78(15.6)		
<b>Occupation</b>					
Student	136(27.2)	95(19.0)	231(46.2)	0.477	0.735
Civil servant	68(13.6)	43(8.5)	111(22.1)		
Artisan	26(5.2)	23(4.6)	49(9.8)		
Trader	17(3.4)	9(1.8)	26(5.2)		
Unemployed	58(10.6)	30(6.0)	83(16.6)		
<b>Ethnicity/race</b>					
Yoruba	201(40.2)	130(26.0)	331(66.2)	0.312	0.035*
Hausa	(0.4)	9(1.8)	16(2.2)		
Igbo	40(8.0)	22(4.4)	62(12.4)		
Ebira	57(11.4)	39(7.8)	96(19.2)		
<b>Education level</b>					
Pry education	17(3.4)	9(1.8)	26(5.2)	0.746	0.278
Sec. education	20(4.0)	21(4.2)	41(8.2)		
Tert. Education	263(52.6)	170(34.0)	433(86.6)		
<b>Allowance</b>					
<N10,000	104(20.8)	70(14.0)	17(34.8)	0.618	0.881
N10,001 – 20,000	57(11.4)	45(9.0)	102(20.4)		
N20,001 – 30,000	71(14.2)	43(8.6)	114(22.8)		
N30,001 – 50,000	34(6.8)	20(4.0)	54(10.8)		
N50,001 above	34(6.8)	22(4.4)	56(11.2)		

**Level of awareness of respondents about overweight/obesity**

About (77.4%) of the participants have heard about obesity while (22.6%) have not. Hospitals and Radio/Television (19% and 18% respectively) were the major sources of information for the respondents who have heard of obesity. There was serious lack of awareness about the instrument for measuring body weight. Only 22.2% were able to identify bathroom scale, the

instrument used for measuring body weight. Only (37%) knew that overeating is one of the risk factor of developing overweight and obesity. About 35.2% of the respondents have never checked their body weight while 32.0% checked their weight a month before this study was carried out. Nearly half of the subjects (44.0%) recognized that obesity can predispose one to diabetes mellitus (table 2).

**Table 2: Level of awareness of respondents about overweight/obesity**

Level of Awareness	Urban 300(%)	Rural 200(%)	Total (%)
<b>Heard about obesity</b>	F (%)	F (%)	F (%)
Yes	228(76.0)	159(79.5)	387(77.4)
No	72(24.0)	41(20.5)	113(22.6)
<b>Source of information</b>			
Hospital	50(16.5)	45(22.5)	95(19.0)
Radio/television	50(16.5)	40(20.0)	90(18.0)
School	45(15.0)	20(10.0)	65(13.0)
Seminar/conference	17(5.6)	10(5.0)	27(5.4)
Public campaign	23(7.6)	17(8.5)	40(8.0)
Others(mosque, meetings, Club and church)	43(14.3)	27(13.5)	70(14.0)
<b>Body weight instrument</b>			
Body mass index	82(16.4)	56(11.2)	133(27.6)
Bathroom scale	63(12.6)	50(10)	113(22.6)
Thermometer	69(13.8)	39(7.8)	108(21.6)
Others	53(10.6)	31(6.2)	84(16.8)
Height meter	33(6.6)	24(4.8)	57(11.4)
<b>Cause of obesity</b>			
Over – eating	104(20.8)	81(16.2)	185(37.0)
Diarrhea	92(18.4)	61(12.2)	153(30.6)
Constipation	70(14.0)	42(8.4)	112(22.4)
Headache	34(6.8)	16(3.2)	50(10.0)
<b>Checked your body weight</b>			
Never check body weight	108(21.6)	68(13.6)	176(35.2)
Checked last month	98(19.6)	62(12.4)	160(32.0)
Last week	18(3.6)	16(3.2)	34(6.8)
Cannot remember	76(15.2)	54(10.8)	130(26.0)
<b>Disease associated with obesity</b>			
Diabetes	129(25.8)	91(18.2)	220(44.0)
Headache	56(11.2)	39(7.8)	95(19.0)
Ulcer	55(11)	33(6.6)	88(17.6)
Constipation	42(8.4)	25(5.0)	67(13.4)
Diarrhea	17(3.4)	9(1.8)	26(5.2)
Others	1(0.2)	3(0.6)	4(0.8)

### Respondent's perception of their body weight

Table 3 below revealed that over 60% of the subjects perceived to have a normal weight while only 26.7% and 5.2% thought they are fat and slim respectively. About 33.8% said they would increase their exercise, if they are told to be overweight while 27.0% considered it to be good. Eating too much was perceived by 29.0% of the respondents to be responsible for their body size while 42.2% believe its nature that was responsible for their body weight. Only 2.8% of them desire to be fatter.

### Knowledge of respondents on the perceived reproductive health outcomes of obesity

A total of 252 (50.2%) of the participants perceived that obesity increase the risk of miscarriage, 49% agreed that it increases the chances of an individual to die young. About 64.8% of the participants don't agree that obesity cause irregular period and infertility among women. However, about 20.6% and 22.4% recognizes obesity as risk factor for breast cancer and endometrial cancer respectively (table 4a). Majority of subjects (62.2%) had average knowledge health implications (HI) of which 38.4% of them were from urban centre of the

**Table 3: Respondent's perception of their body weight**

Perceptions	Urban (%) f (%)	Rural (%) f (%)	Total (%) f (%)
<b>Perceptions of body size</b>			
Thin	16(3.2)	13(2.6)	29(5.8)
Normal	185(37.0)	131(26.2)	316(63.2)
Fat	82(27.3)	49(24.5)	131(26.2)
Others	17(3.4)	7(1.4)	24(4.8)
<b>Things to do if considered too fat</b>			
I will do nothing	85(17.0)	50(10.0)	135(27.0)
I will change my feeding habit	42(8.4)	29(5.8)	71(14.2)
I will visit the hospital	76(15.2)	52(10.4)	128(25.6)
I will increase my physical activity level	97(19.4)	68(13.6)	165(33.6)
Others	0(0.0)	1(0.2)	1(0.2)
<b>OV/OB, would you lose weight</b>			
Yes	283(94.3)	191(95.5)	474(94.8)
No	17(5.7)	9(4.5)	26(5.2)
<b>Things that's responsible for your body size</b>			
I eat too much	84(16.8)	55(11.0)	139(27.8)
I eat too little	6(1.2)	4(0.8)	10(2.0)
Its nature	128(25.6)	83(16.6)	211(42.2)
I don't exercise	47(9.4)	32(6.4)	79(15.8)
I'm very worried/stress	0(0.0)	1(0.2)	1(0.2)
Don't know	34(6.8)	20(4.0)	54(10.8)
I have peace of mind	0(0.0)	3(0.6)	3(0.6)
Others	1(0.2)	2(0.4)	3(0.6)
<b>How do you appreciate your body size</b>			
I like it and I will maintain it	150(30.0)	604(20.8)	254(50.8)
Want to be fatter	8(1.6)	6(1.2)	14(2.8)
Want to be thinner	68(13.6)	43(8.6)	111(22.2)
Don't know	57(11.4)	37(7.4)	94(18.8)
Others			

study area. Only 5.0% of the participants had high knowledge of health implication of obesity. Low knowledge health implication amounted to about 33% of the subjects. Table (4b)

### Anthropometric parameters of the Respondents

The mean height and weight of the participants in this present study were found to be  $1.605 \pm 0.055$  and  $59.195 \pm 8.7670$  respectively (table 5). There

**Table 4a: Knowledge of respondents on perceived health implications of obesity**

Diseases condition	Urban (%)		Rural (%)		Total (%)	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Diseases conditions						
Low life expectancy	150(30.0)	150(30.0)	95(19.0)	105(21)	245(49.0)	255(51.0)
Miscarriage	150(30.0)	150(30.0)	101(20.2)	99(19.8)	251(50.2)	249(49.8)
Irregular period	142(47.3)	158(52.7)	89(44.5)	111(55.5)	231(46.2)	269(53.8)
Infertility	108(36.0)	108(64.0)	68(34.0)	132(66.0)	176(35.2)	324(64.8)
Cesarean section	131(26.2)	169(33.8)	79(15.8)	121(24.2)	210(42.0)	290(58)
Breast cancer	63(21.0)	237(79.0)	40(20.0)	160(80.0)	103(20.6)	397(79.4)
Birth Defects	112(22.4)	188(37.6)	61(12.2)	139(27.8)	173(34.6)	327(65.4)
Still birth	99(19.8)	201(40.2)	65(13.0)	135(27.0)	164(32.8)	336(67.2)
Endometrial cancer	64(21.3)	236(78.7)	58(29.0)	142(71.0)	114(22.8)	386(77.2)

**Table 4b: Knowledge score of perceived health implication of obesity**

Score point	Indication	Urban (%)	Rural (%)	Total (%)
≤ 3 point	Low knowledge	95(19.0)	69(13.8)	164(32.8)
≥4≤6point	Average knowledge	191(38.4)	120(24.0)	311(62.2)
≥7≤9point	High knowledge	14(2.8)	11(2.2)	25(5.0)

**Table 5a: Anthropometric parameters of the Respondents**

Variables	Urban	Rural	Total	P-value
Height (m)	$1.607 \pm 0.0579$	$1.605 \pm 0.055$	$1.606 \pm 0.0565$	0.139
Weight(kg)	$58.52 \pm 9.5537$	$59.87 \pm 7.982$	$59.195 \pm 8.7679$	0.002*
BMI(kgm <sup>-2</sup> )	$22.658 \pm 3.50$	$23.248 \pm 2.80$	$22.953 \pm 3.15$	0.001*
<b>body mass index ( kgm<sup>-2</sup>)</b>				
Under weight (<18.5kgm <sup>-2</sup> )	18(6.0)	4(2.0)	22(4.4)	0.003*
Normal (18.5 – 24.99)	219(73.0)	146(73.0)	365(73.0)	
Overweight (25- 29.99)	46(15.3)	47(23.5)	93(18.6)	
Obesity grade 1 (30 – 34.99)	17(5.7)	3(1.5)	20(4.0)	
<b>Total</b>	<b>300(100.0 )</b>	<b>200(100.0 )</b>	<b>500(100.0)</b>	

\*significant (P<0.05)

**Table 5b: Knowledge of health implication of obesity on anthropometric status**

Parameters	Body mass index				Total
	Underweight	Normal	Overweight	Obesity	
<b>KOHI score</b>					
Low Knowledge	7(1.4)	122(24.4)	27(5.2)	8(1.6)	164(32.8)
<b>Moderate Knowledge</b>	15(3.0)	222(44.4)	64(12.8)	10(2.0)	311(62.2)
<b>High Knowledge</b>	0(0.0)	21(4.2)	(0.4)	2(0.4)	25(5.0)

X<sup>2</sup> 6.164; P= 0.405; KOHI- Knowledge of Health Implication score

was no significant difference between the height of the rural and urban participants at ( $p < 0.05$ ) but, a significant difference was observed in their body weight. Only (4.4%) of the study population were underweight, two-third (73%) were within the healthful BMI range while about (18.6%) of the participants were found to be overweight. However, 4% were battling with obesity. Urban participants were more obese than their rural counterpart, just as the rural participants were less underweight.

### Discussion

Literacy level was very high and about 86.6% of the subjects have higher education certificate, this was higher than the observed value in a study conducted in Ibadan among women reproductive age by Ajayi and Oyewole (21) where 56% of their participants had tertiary education certificate. Majority of the participants were students and civil servants and this could further explain the high level of literacy observed in this study. Nearly all the civil servants in this study were from urban part of the study area. The urban nature of the city coupled with the fact that the town is flooded with modern social amenities, higher institutions and tertiary healthcare system and also the proximity of the city to the state capital could have further be responsible for the high prevalence of civil servant among the urban respondents in this study. Nearly half of the subjects (44.0%) recognized that obesity risk factor for diabetes mellitus.

There were misconceptions that overweight and obesity causes headache, ulcer, diarrhea and constipation and knowledge deficit on the awareness about the real causes overweight/obesity. This is disheartening and calls for an urgent health education on the causes of overweight/obesity with on body weight checkup and the needs to change their perception about eating habits and misconception about the causes of obesity without which it would be difficult for an individual to be abreast to reduce their extra weight since they do not even know their body weight. In this study more than two-third (88.8%) do not agreed that overweight and obesity can be control, this wrong notion and a serious obstacle to weight reduction program among people.

Miscarriage and irregular periods were the most identified reproductive health outcomes among the respondents. This result is in conformity with the findings of Eden *et al.* (11) on the knowledge of obesity and impact on reproductive health outcome, where about 37.5% and 35.5% of their study population identified miscarriage and irregular period respectively as the most perceived reproductive health outcome listed. This is in disagreement with the study conducted by Ajayi and Oyewole (21) in Ibadan where infertility (34.4%) and obstructed labour (33.0%) were the most identified reproductive health outcomes by the respondents. Our study shows that 35.2% of the respondents' actually perceived obesity as risk factor for infertility, this may be due to the fact that these respondents are in their child bearing age and thus are more aware of their health and its effects on reproduction. Studies have shown that women are more motivated to engage in healthy behavior during pregnancy (27, 28). This study further revealed that stillbirth and endometrial cancer were the least considered reproductive health outcomes perceived by the respondents, there was a lack of knowledge concerning the health implications of obesity by the majority of the participants. Studies have shown that obese women with cancer may have decreased survival rate because of late screening, comorbid illness, or poorer response to treatments (29, 30). Similar trend was observed in the study of Eden *et al.* (11) where only 18.1% and 14.1% were able to perceived obesity as risk factor for stillbirth and endometrial cancer respectively. In 2001 the international Agency for research on cancer found that there was convincing evidence based on large cohorts and case-control studies that obesity is associated with a 2 – to 3 fold risk in endometrial cancer (29, 31). In this study, majority of the participants were educated but unfortunately this didn't translate to knowledge of obesity and reproductive health outcomes as observed in this study. About one- third had low knowledge score which implies that (32.8%) of the respondents were unable to identify four perceived reproductive health outcomes of obesity while only 5% were able to identify seven or more health outcomes of obesity. This lack of knowledge is unlikely to be reflection of low education level but could be linked to poor health



literacy. The rates of Overweight/Obesity as determined by abnormal values for Body Mass Index (BMI) was about 22.6%. Over nutrition is the fifth leading risk factor for global death and at least 2.8 million adults died each year as a result of being overweight or obese (7). In the study obesity was significantly higher in urban area than the rural area. This difference could be attributed to the fact that the urban nature of the study area coupled with change in dietary patterns of populations of developing world could have resulted in the high prevalence of obesity found among the urban participants. The prevalence of obesity and overweight as revealed by BMI in this study (4.0% vs 18.6%) respectively is lower than (10% vs 20.6%) respectively, reported by Nigeria demographic health survey (25) for women from age 15 -49 years who were obese and overweight in Ondo state. It's also interesting that there was no relationship between knowledge score of reproductive health outcome and body mass index of the respondents ( $X^2$  6.164;  $P=0.405$ ).

### Conclusion

Despite the high literacy observed among the participants in this study, it doesn't translate to health literacy among the respondents; this study observed a low and moderate knowledge score of health implications of obesity among the respondents, coupled with knowledge deficit as per what really causes obesity. Low life expectancy, miscarriage and cesarean section were the most identified perceived reproductive health outcomes. Hospitals and media (radio/television) were the most responsible source of information about obesity. The prevalence of general obesity among the subjects was lower than Overweight. Medical and community based health educators should take advantage of opportunity to educate their patients and women of reproductive age on BMI and the risk of obesity on reproductive outcomes.

### Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the design, data collection, writing and funding of this research.

### References

1. CDC (2013). The fourth report on the diagnosis, evaluation, and treatment of high

blood pressure in children and adolescents. U.S

2. Ng, S. W. Zaghoul, S., Ali, H. I., Harrison, G. and B. M. Popkin, B. M. (2011). The prevalence and trends of overweight, obesity and nutrition-related non-communicable diseases in the Arabian Gulf States. *Obesity Reviews*, 12(1): 1-13
3. Flegal, K. M., Carroll, M. D., Kit, B. K. and Ogden, C. L. (2012). Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *The Journal of the American Medical Association*, 307(5): 491-497
4. World Health Organization-WHO (2010). Global status report on non-communicable diseases 2010. WHO Press, Geneva. Retrieved on March 13, 2012 from [http://www.who.int/nmh/publications/ncd\\_report\\_full\\_en.pdf](http://www.who.int/nmh/publications/ncd_report_full_en.pdf)
5. Ziraba, A. K., Fotso, J. C., and Ochako, R. (2009). Overweight and obesity in urban Africa: a problem of the rich or the poor? *BMC Public Health*, 9: 465.
6. World Health Organization (2013). Obesity and overweight. Available from: <http://www.who.int/mediacentre/factsheets/fs311/en/> [Cited 2013 Feb 21].
7. Wang Y, Beydoun M.A (2007). The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiology Review*; 29:6-28.
8. Hossain, P., Kawar, B. and El Nahas, M. (2007). Obesity and diabetes in the developing world- a growing challenge. *New England Journal of Medicine*, 356: 213-215.
9. Chew LD, Griffin JM, Partin MR, (2008). Validation of screening questions for limited health literacy in a large VA outpatient population. *Journal of general internal medicine*. 23(5): 561-6.
10. Wallace L.S, Rogers E.S, Roskos S.E, Holiday D.B , Weiss B.D (2006). Brief report: screening items to identify patients with limited health literacy skills. *Journal of general internal medicine*; 21(8):874-7.
11. Eden R.Tanaka J.D, Lisa M.N, Maureen E.B, Geraldine E.E, Randall B.B, and Erica E.M, (2013). Knowledge of Obesity and Its

- Impact on Reproductive Health Outcomes among Urban Women. *J Community Health*. 38(2): 261–267
12. Siega-Riz A.M, King J.C (2009). Position of the American Dietetic Association and American Society for Nutrition: obesity, reproduction, and pregnancy outcomes. *Journal of the American Dietetic Association*. 109(5):918–27.
  13. Eliassen A.H, Colditz G.A, Rosner B, Willett W.C, Hankinson S.E (2006). Adult weight change and risk of postmenopausal breast cancer. *Journal of America Medical Association*. 296(2):193–201
  14. Modesitt S.C, van Nagell JR Jr (2005). The impact of obesity on the incidence and treatment of gynecologic cancers: a review. *Obstetrics Gynecology Survey*.; 60(10):683–92
  15. Fedorcak P, Dale PO, Storeng R, et al. Impact of overweight and underweight on assisted reproduction treatment. *Human Reproduction Update* 2004; 19(11):2523–8.
  16. Maheshwari A, Stofberg L, Bhattacharya S (2007). Effect of overweight and obesity on assisted reproductive technology--a systematic review. *Human Reproduction Update*. 13(5):433–44.
  17. Metwally M, Ong K.J, Ledger W.L, Li T.C (2008). Does high body mass index increase the risk of miscarriage after spontaneous and assisted conception? A meta-analysis of the evidence. *Fertility Sterilization* 90(3):714–26.
  18. Poobalan AS, Aucott LS, Gurung T, Smith WC, Bhattacharya S. Obesity as an independent risk factor for elective and emergency caesarean delivery in nulliparous women- systematic review and meta-analysis of cohort studies. *Obes Rev*. 2009; 10(1):28–35.
  19. Sivalingam S.K, Ashraf J, Vallurupalli N, Friderici J, Cook J, Rothberg M.B (2011). Ethnic differences in the self-recognition of obesity and obesity-related comorbidities: a cross-sectional analysis. *Journal General Internal Medicine*; 26:616–620
  20. Shrivastava P, Ramasamy J. (2013). Assessment of knowledge about obesity among students in a medical college in kancheepuram district, tamilnadu. *Journal of Program Health Science* 3(24) 121-126
  21. Ajayi YP and Oyewole E.O (2014). Knowledge of risk factors and perceived health implication of obesity among women of reproductive age in Ibadan southwest local government area, Nigeria. *Book of abstract nutrition society of Nigeria* page 71
  22. Smith, R.S (1988). *Kingdoms of Yoruba*, Madison university of Wisconsin press 3<sup>rd</sup> edition. P 52.
  23. National population commission (2006). *The national population census Lagos*
  24. Araoye MO (2008). *Sampling Techniques and Research Methodology with Statistics*. Ilorin, Nigeria: University Press; p. 68-91
  25. Nigeria Demographic and Health Survey (2013).
  26. World Health Organization (2008). *Waist Circumference and Waist - Hip Ratio: Report of a WHO Expert Consultation, Geneva, 8-11 December, 2008*. Geneva: World Health Organization; p. 1-39.
  27. Liou, G.M (2008). Preconception window; advising the pregnancy-planning couple. *Fertilization sterilization* 89(2)119-21
  28. Cardozo E, Pavone M.E, Hirshfeld-Cytron J.E (2011). Metabolic syndrome and oocyte quality. *Trends Endocrinology Metabolism*. 2011; 22(3):103–9.
  29. Cohen, S.S., Larson, C.O., Matthews, C.E., Buchowski, M.S., Signorello, L.B., Hargreaves, M. K. and Blot, W. J. (2009). Parity and breastfeeding in relation to obesity among Black and White Women in the Southern Community Cohort Study. *Journal of Women's Health*, 18(9): 1323-1332
  30. Chang, C.T., Chang, K. H and Cheah, W.L ((2009). Adults' perceptions of being overweight or obese: a focus group study. *Asia Pacific Journal of Clinical Nutrition*, 18(2): 257-264
  31. Chu, S. Y., Callaghan, W. M., Bish, C.L. and D Angelo, D. (2009). Gestational weight gain by body mass index among US women delivering live births, 2004-2005: fueling future obesity. *American Journal of Obstetrics and Gynecology*, 200(3): 271.e1–7.