Research article

Knowledge of Diets as A Modifiable Risk Factor of Obesity Among Women of Reproductive Age in Ibadan, Nigeria

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ABSTRACT

Knowledge of Women of Reproductive Age (WRA) on diets as a Modifiable Risk Factor (MRF) of obesity was assessed in a descriptive cross-sectional study design. A multi-stage sampling technique and semi-structured, interviewer-administered questionnaire were adopted to elicit information. Knowledge of diets as MRF was assessed on a 12-point scale and poor score was ≤7 while good was >7. Obesity was assessed using Body Mass Index (BMI) and respondents with BMI ≥30kg/m^2 were classified as obese. Pattern of consumption of high calorie foods was assessed using a 7-day food frequency questionnaire. Respondents' age was 29.9±8.7 years and 56.0% had tertiary education. Sixty-two percent had good knowledge of diets as MRF for obesity and prevalence of obesity was 18.6%. Frequently consumed high calorie foods included cocoa-based drinks (24.8%), carbonated sweet drinks (19.6%) and high calorie snacks (15.4%). The MRFs of obesity mentioned by the respondents were bad eating habits, which included frequent consumption of high calorie foods (71.2%), genetic predisposition (48.2%) and inactivity (32.0%). Knowledge of diets as MRF was not significantly associated with BMI at p≤0.05. Respondents aged 30-34 years were more likely to have higher knowledge of healthy eating as MRF of obesity than those aged 15-19 years (OR: 2.6; 95%CI: 1.3–5.2). Despite the awareness on causes of obesity, there was no significant difference between knowledge of diets as risk factors to obesity and BMI. Nutrition education on healthy eating, which encourages consumption of fruits and vegetables and reduced consumption of high calorie foods should be directed at WRA using appropriate health promotion approaches.

Keywords: *Obesity, Modifiable risk factor, Diets, High calorie foods*

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INTRODUCTION

Non-communicable diseases are the major cause of death worldwide; besides mortality, these diseases also cause high rates of morbidity and disability (Boutayeb, Boutayeb and Boutayeb, 2013). Obesity is among these non-communicable diseases. Once considered a high-income country problem, overweight and obesity are now on the rise in low and middle-income countries, particularly in urban settings. In Nigeria, although both under-nutrition and over-nutrition are common problems, obesity and its associated problems have been identified as a public health problem among rural women, men and children (Bakari, Onyemelukwe, Sani, Hassan and Aliyu, 2007). Obesity is becoming increasingly more prevalent in many African and other developing countries with nutritional transition as a result of urbanization, adoption of western lifestyles and demographic transition being implicated for the upsurge (Ojofeitimi, Adeyeye, Fadiora, Kuteyi, Faborode,

Adegbenro, Bakare, Setiloane, and Towobola, 2007; Levitt, 2008). It is currently estimated that as much as 20.0 – 50.0% of urban populations in Africa are classified as either overweight or obese (Kamadjeu, Edwards, Atanga, Kiawi, Unwin, Mbanya, 2006; Sodjinou, Aguey, Fayomi and Delisle, 2008), and that by 2025 three quarters of the obese population worldwide will be in non-industrialized countries (WHO, 2005). In Nigeria, a 2008 WHO report puts the prevalence of overweight and obesity at 26.8% and 6.5% respectively (WHO, 2011).

Obesity is the consequence of a long-term imbalance between energy intake and energy expenditure determined by food intake and physical inactivity and influenced by biological and environmental factors (Kleiser, Schaffrath, Mensink, Prinz-Langenohl, and Kurth, 2009). The risk factors of overweight and obesity are multi-factorial and gender specific. Hou, Jia, Bao, Lu, Jiang, Zuo, Gu and Xiang, (2008) findings support the notion that some risk factors can be used to identify individuals with high risk of overweight and

obesity. Obesity has been implicated in complications associated with delivery among women of reproductive age ((Oversen et al, 2011)). There is dearth of information on the knowledge of diets as MRF of obesity among women of reproductive age in Oyo State and Nigeria at large. Therefore, it is necessary to properly investigate women's knowledge of diets as MRF of obesity as this will provide baseline information for health promotion and nutrition education programmes to assist policy makers in taking the right and appropriate actions related to public health nutrition education.

While the causes of the obesity epidemic are simple in principle i.e. an imbalance between energy consumption (diet) and energy expenditure (physical activity), in reality the problem is complex and the result of an interaction between genetic, lifestyle, and environmental factors (Booth, Pinkston, and Poston, 2005). The major risk factor or cause of overweight and obesity is a positive energy imbalance in which energy intake exceeds energy expenditure (Cataldo, DeBruyne, and Whitney, 2003). There are many complex behavioural and societal factors that combine to contribute to the causes of obesity. Butland, Jebb, Kopelman, McPherson, Thomas, Mardell and Parry (2007) referred to a "complex web of societal and biological factors that have, in recent decades, exposed inherent human vulnerability to weight gain". For simplicity the foresight obesity map designed by Butland et al., 2007 has been divided into 7 cross-cutting predominant themes, which represent the major factors contributing to obesity, they include: physiology, individual activity, physical activity environment, societal influences, individual psychology, food production and food consumption.

MATERIALS AND METHODS

A cross-sectional survey was carried out among 500 women of reproductive age in Ibadan South-West Local Government Area, Ibadan. A multi-stage sampling technique was used to select the participants for this study. A semi-structured questionnaire was used to elicit information on the socio-demographic characteristics of respondents, pattern of consumption of high calorie foods and knowledge of diets as MRF to obesity. Knowledge of diets as MRF to obesity was assessed with a 6-item knowledge scale rated on 12 points; scores between 0-7 were classified as poor while scores >7 was classified as good. Consumption of high calorie foods was assessed with the aid of a 7-day Food Frequency Questionnaire (FFQ). Overall, consumption pattern of risky food items (fatty, junk and sugary foods) was categorized according to level of risk and on a validated scale of 0-56. Respondents with scores between 0-28 had low risk eating pattern while >28 had high risk eating pattern. A coding guide was developed and used for the open-ended responses. Body weight was measured in kilogram using a validated weighing scale while height was measured in metres using portable validated locally manufactured stadiometers. Body Mass Index (BMI) was calculated as weight in kilograms divided by height in metres squared.

Each administered questionnaire was sorted, cleaned, coded and entered for analysis, using descriptive and inferential (Chi-square test and logistic regression model) statistics at p≤0.05.

RESULTS

About a quarter (22.2%) of the respondents was aged 25-29 years while respondents aged 40-44 and 45-49 years were 6.6% and 9.2%, respectively. More than half (60.0%) of the respondents had biological children while 40.0% did not have biological children. Details of the socio-demographic characteristics of the respondents are presented on Table 1.

Table 1:
Socio-Demographic Characteristics of Respondents (N=500)

Age group (Years)	Frequency	Percentage
15-19	54	10.8
20-24	95	19.0
25-29	111	22.2
30-34	97	19.4
35-39	64	12.8
40-44	33	6.6
45-49	46	9.2
Marital status		
Single	207	41.4
Married	253	50.6
Divorced	2	0.4
Widow	16	3.2
Separated	5	1.0
Co-habited	17	3.4
Level of education attained		
Primary	32	6.4
Secondary	177	35.4
Tertiary	280	56.0
Apprenticeship	11	2.2
Religion		
Christianity	395	79.0
Islam	104	20.8
Traditional	1	0.2
Ethnicity		
Yoruba	420	84.0
Igbo	42	8.4
Hausa	2	0.4
Minority group	33	6.6
Non national	3	0.6
Respondent's occupation		
Artisans	82	16.4
Traders	197	39.4
Civil servants	78	15.6
Professionals	26	5.2
Students	100	20.0
Not working	17	3.4

The prevalence of underweight, overweight and obesity among the respondents in this study was 4.4%, 27.4% and 18.6% respectively. High calorie foods consumed by the respondents were oily soups (11.8%), snacks (15.4%), fried foods (15.2%), cocoa-based drinks/beverages (24.8%), soft drinks (19.6%), fatty meat (8.0%), confectionaries (16.6%)

and nuts (11.8%). Details of the consumption pattern of highlighted high calorie food items are presented on Table 2.

Table 2:
Respondents' Weekly Consumption Pattern of High Calorie Food Items and Level of Risk (N=500)

Variables	No.	%
Oily Soups		
Very risky	1	0.2
Risky	59	11.8
Moderately risky	278	55.6
No risk	162	32.4
Snacks		
Very risky	28	5.6
Risky	77	15.4
Moderately risky	201	40.2
No risk	194	38.8
Fried food		
Very risky	18	3.6
Risky	76	15.2
Moderately risky	210	42.0
No risk	196	39.2
Cocoa-based drinks/Beverages		
Very risky	70	14.0
Risky	124	24.8
Moderately risky	196	39.2
No risk	110	22.0
Sweet carbonated drinks		
Very risky	57	11.4
Risky	98	19.6
Moderately risky	195	39.0
No risk	150	30.0
Fatty meat		
Very risky	12	2.4
Risky	40	8.0
Moderately risky	151	30.2
No risk	297	59.4
Confectionaries		
Very risky	43	8.6
Risky	83	16.6
Moderately risky	206	41.2
No risk	168	33.6
Nuts		
Very risky	8	1.6
Risky	59	11.8
Moderately risky	166	33.2
No risk	267	53.4

Key:
Code 1 (Very risky): 7 times/week
Code 2 (Risky): 4-6 times/week
Code 3 (Moderately risky): 2-3 times/week
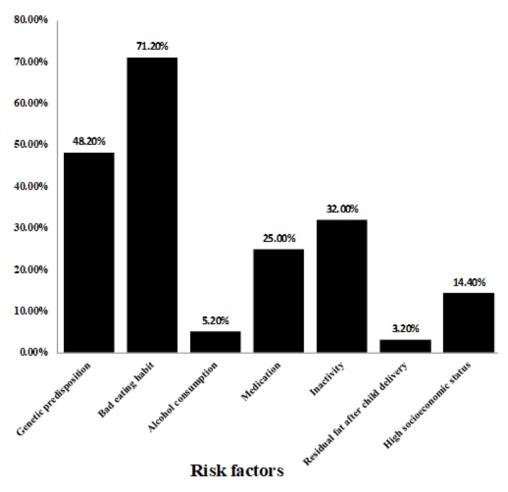Code 4 (No risk): Once/week

Majority (88.6%) of the respondents had low risk consumption pattern of high calorie foods while 11.4% had high risk consumption pattern. The mean score for consumption of high calorie foods was 19.9 ± 7.0.

The risk factors/causes of obesity mentioned by the respondents included bad eating habit (low intake of fruits and vegetables, and consumption of fatty and sugary foods), genetic predisposition, inactivity, medication and residual fat after child delivery (details on Figure 1). Respondents identified exercise (87.1%), healthy diets (low calorie foods, fruits and vegetables) and eating habit (65.5%), depression (13.7%), not being sedentary/active (13.5%) and drug misuse/abuse (11.4%) as factors that could not contribute to obesity. Majority (66.2%) accepted that high socio-economic status could not result into obesity while 30.6% and 3.2% did not accept and did not know, respectively. When asked if "constant exposure to adverts and marketing of high calorie foods may predispose to obesity", the responses were: Yes (71.8%), No (24.2%) and I do not know (4.0%). The common lifestyles identified by the respondents to be associated with obesity was inactivity (71.4%), bad eating habit (64.6%), alcohol consumption (20.5%) and lack of exercise (6.2%).

The mean knowledge score of diets as MRF to obesity was 8.3 ± 2.5. Respondents with good knowledge were 62.0% while those with poor knowledge score were 38.0%.

Table 3:
Relationship between selected variables and Knowledge of Diets as Modifiable Risk Factors to Obesity

Age group in years	Categorization of Knowledge of diets as MRF of obesity			χ^2	df	p
	Poor N (%)	Good N (%)	Total			
15-19	27(50.0)	27(50.0)	54	14.6	6	0.02
20-24	43(45.3)	52(54.7)	95			
25-29	39(35.1)	72(64.9)	111			
30-34	27(27.8)	70(72.2)	97			
35-39	26(40.6)	38(59.4)	64			
40-44	16(48.5)	17(51.5)	33			
45-49	12(26.1)	34(73.9)	46			
Level of education attained						
Primary	17 (53.1)	15 (46.9)	32	8.9	3	0.03
Secondary	75 (42.4)	102 (57.6)	177			
Tertiary	92 (32.9)	188 (67.1)	280			
Apprenticeship	6 (54.5)	5 (45.5)	11			
BMI						
Under weight	10(45.5)	12(54.5)	22	0.82	3	0.85
Normal weight	91(36.7)	157(63.3)	248			
Over-weight	54(39.4)	83(60.6)	137			
Obese	35(37.6)	58(62.4)	93			

Figure 1:
Perceived risk factors to obesity among women of reproductive age

DISCUSSION

The prevalence of overweight and obesity in this study was 27.4% and 18.6%, respectively. In Nigeria, a WHO report puts the prevalence of overweight and obesity at 26.8% and 6.5%, respectively (WHO, 2011). When compared to the findings from other African countries, the prevalence of obesity obtained in this study is similar to the 18.0% that was reported in a study among urban dwellers in the Republic of Benin (Sodjinou et al., 2008) but higher than the 13.6% reported in Ghana (Amoah 2003). An earlier cross-sectional study in the southwestern part of Nigeria also found obesity to be present in 21.2% of the subjects (Ojofeitimi et al., 2007).

The findings from this study also showed that respondents had a very risky consumption pattern for sweetened beverages/cocoa-based drinks, sweet carbonated drinks, oily soups, snacks and fried foods. Forslund, Togerson, Sjostron and Lindross (2005) revealed from their study that women were more frequent snacks consumer than men. This is also similar to the findings of Olumakaiye, Atinmo, and Olubayo-Fatiregun (2010) that showed that about 33.0% of their respondents consumed snacks daily but to a varying degree. This study also

revealed that majority (88.6%) of respondents consumed high calorie food items at a low risk level. This shows that consumption pattern of high calorie foods among women of reproductive age in the study area was low but it cannot be concluded that they consumed healthy diets generally. This study also reveals that there was no relationship between the consumption pattern of respondents and their BMI (p=0.52). This was similar to the findings of Prabhat and Begum (2012) which revealed that prevalence of central obesity was a common phenomenon in the majority of the selected women regardless of their dietary practices. Duvigneaud, Wijndaele, Matton, Philip-paerts, Lefevre and Thomis (2007) and Vilela, Sichieri, Pereira, Cunha, Rodrigues, Gonçalves-Silva, Ferreira (2014) in their separate studies conducted among adult males and females showed that there is positive association between a high intake of fat and central adiposity (increased waist circumference and WHR).

The major risk factors of obesity identified by the respondents were bad eating habit, genetic predisposition and inactivity. This was in line with the findings by Butland et al., (2007), which showed that obesity is influenced by a complex web of societal and biological factors. Majority (71.2%) of the respondents agreed that dietary habits is MRF of obesity and this is supported by Simkhada et al., 2009 which showed that increased urbanization leading to consumption of fatty foods and decreased physical activity are considered major contributory factors to obesity. When asked if one's lifestyle is associated with becoming obese, most respondents (64.2%) answered affirmatively. This was at variance with the finding of Faber and Kruger (2005) that showed that only a few participants believed that obesity is caused by behavioural factors such as eating too much food or a lack of exercise. The common lifestyles identified by the respondents to be associated with obesity are in agreement with the findings of Wilding (2006), who reported that behavioural factors which may promote obesity included consumption of high calorie fast foods, high fat diets, snacking, alcohol consumption, etc. Most (62.0%) of the respondents had high knowledge of diets as MRF to obesity indicating that few people were unaware of one of the modifiable causes of obesity. This was supported by the finding of Kruger and van Aardt (1998) which revealed that knowledge of obese black women on the causes of obesity, the relationship between obesity and health, and ways of combating obesity was reasonably extensive. Arturo, Yolanda, Castillo-Ruiz, Gonzalez-Ramirez and Bacard (2012) also

revealed that low income Mexican women had reasonably good knowledge of the causes of obesity.

This study also revealed that there was association between some socio-demographic variables (age and level of education) and knowledge of diets as MRF of obesity (details on Table 3). Chi-square statistical analysis that showed there was an association between age group of respondents and their knowledge of diets as MRF of obesity ($p<0.05$). Respondents aged 30-34 years were 2.6 times more likely to have higher knowledge of diets as MRF to obesity than those aged 15-19 years (OR 2.6, 95%CI: 1.3 - 5.2) and those aged 45-49 years were also 2.8 times more likely to have higher knowledge of diets as MRF to obesity than those aged 15-19 years (OR 2.8, 95%CI: 1.2 - 6.6). Further analysis showed that 67.1% of respondents with tertiary education had good knowledge of diets as MRF to obesity when compared to 57.6% among those who had secondary education ($p=0.03$). Therefore, there was also significant association between level of education and knowledge of diets as MRF to obesity. This implies that the older and more educated a woman is; the higher the knowledge she possesses on modifiable causes of obesity. Several studies (Arturo et.al. 2012; Covic, Roufeil and Dziurawiec, 2007; Kersey, Lipton, Quinn, and Lantos, 2010) have also affirmed that being older than 30 years, living with a spouse and having more than six years of education were predictors of better knowledge of diets as one of the modifiable causes of obesity. Despite the high knowledge recorded by the respondents on diets as one of the MRFs to obesity, there was no relationship between this knowledge and their BMI status ($p=0.85$).

This research focused on assessing the level of knowledge of women of reproductive age on modifiable risk factors to obesity and consumption pattern of some selected locally available high calorie food items. Findings from the study revealed that the participants had good knowledge of diets as a modifiable risk factor of obesity and the prevalence of obesity was still 18.6%. Despite the good knowledge of poor eating habit as one of the causes of obesity, this study also showed that there was no significant difference between knowledge of this modifiable risk factors to obesity and BMI of respondents. Nutrition education focusing on behaviour change approaches should be promoted among women of reproductive age to prevent adverse consequences that are associated with safe delivery during child birth. Healthy living in terms of consumption of fruits and vegetables, regular aerobic exercises and discouragement from consumption of calorie-dense diets are some of the issues that should be addressed in educating women of reproductive age on this preventable epidemic. Potential focus for future interventions must include public health nutrition education policy to support promotion of healthy eating in addition to regular exercise and increase public awareness on the fatal consequences of not adhering to healthy lifestyles and behaviours.

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