Food Consumption Score, Dietary Habits and Anthropometric Indices of Market Traders in Owo Township, Ondo State, Nigeria

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ABSTRACT

Background: *Globally, the burden of obesity and other non-communicable diseases (NCDs) is rapidly increasing, and the African continent is not left out.*

Objective: *This study assessed the food consumption score, dietary habits and anthropometric indices of market traders in Owo Township, Ondo State, Nigeria.*

Methods: *The study was a descriptive cross-sectional study, which involved 205traders who were conveniently selected from three major markets in Owo. Information from the participants was obtained using structured, self- administered questionnaire. Food consumption score was assessed using World Food Programme (WFP) food consumption analysis while central obesity was assessed using Waist–Hip Ratio (WHR), Waist Circumference (WC) and Waist-Height ratio (WHtR). Data was presented in frequency and percentage. All statistics was test at significant level of P ≤ 0.05.*

Results: *Results revealed that (30.2%) of the market traders were within the age group of 30-39years,57.6% of the respondents were married, while approximately27% had between 4 and 6 children. About 67.3% of the respondents were Christian. Few (6.3%) had first degree certificate. Majorities, (90.7%) always add vegetables to their diet and 39.5% % eat fruit regularly while 56.1% meet the acceptable food consumption score. Abnormal values for WC, WHR, and WHtR were 26.8%, 38.5%, and 47.8% respectively.A significant difference existed waist circumference (P=0.02), waist-hip ratio (P=0.003), waist to height ratio (P=0.001), and sex of the respondents.*

Conclusion: *This study observed high prevalence of central obesity and a high acceptable food consumption score level among the market traders in Owo.*

Keywords: Food consumption score, traders, dietary habits, central obesity

INTRODUCTION

The Food Consumption Score (FCS) is an index that was developed by the World Food Programme (WFP) in 1996 (1). The FCS aggregate house hold level data on the diversity and on frequency of food groups consumed during the previous seven days, which is then weighted according to the relative nutritional density of the food, nutrients dense foods, such as animal products are assigned greater value than those containing less nutritionally dense foods, such as tubers. Based on this score, a household's food consumption can be further classified into one of three categories; poor, borderline, or acceptable. The food consumption score is a

proxy indicator of household caloric availability. Validations studies have demonstrated that the FCS and the Household Dietary Diversity Score (HDDS) are both associated with calories intakes, as well as with each other (1, 2). While the FSC has been validated against quantity of caloric intakes, it has not been validated against adequacy of macro nutrient or micro nutrient (3). Market place is an occupational environment which can predispose individuals to obesity, mainly due to sedentary nature and enhanced access to food (4). Market traders are vital part of the agricultural and economic value chain that bridges the gap between famers or manufacturers and the consumers. Market men and women spend most hours of the day sitting down and involve in many other sedentary activities and consume diets with mean daily energy intake higher than recommended levels. These habits surely have a great influence on energy expenditure and may be a great contribution to a sedentary lifestyle which could increase their risk of developing obesity and other non-communicable disease (5).

Nutritional status is the physiological state of an individual, which result from the relationship between nutrient intake and requirements and from the body's ability to digest, absorb and use these nutrients. Inadequate nutrition is related to several chronic diseases that greatly impart morbidity, mortality and quality of life. In spite of the vital importance of nutrition in daily diet for healthy life, many people tend to ignore it. The major importance of balancing nutrient intake is to reduce malnutrition and the prevalence of non-communicable diseases which helps to cut down the enormous health care spending around the world. Intakes of unhealthy diets lower the life expectancy by decades while a healthy diet improve it (6). A study of traders across various parts of Nigeria revealed prevalence of obesity to be 16.3% in Ibadan (7), 12.3% in Lagos (8) and 28.1% in Sokoto (9). There is, however, dearth of information on abdominal obesity and food consumption patterns of market traders in Ondo state. This study investigated the food consumption patterns and anthropometric indices of market traders in Owo township of Ondo State, Nigeria.

Materials and methods

Study Design

The study was a descriptive cross sectional study.

Study Area

The study was carried out in Owo Local Government Area of Ondo State, Nigeria. Owo is one of the first Local Governments created when Ondo State was created in 1976 from the old western state (10). According to 2006 national censor the total population of the local government is 218,886 of which 110,429 are males, while 108,457 are females (11). Majority of the people are government workers, Christianity and Islam are generally the dominating religion practiced by the inhabitants of Owo. The town has six (6) markets within its metropolis. The three markets selected for this study were located one to two kilometers apart from the city centre. The Oba market is an everyday market situated beside the Oba's palace. In contrast, the Ikoko market is a five (5 days) market located about 500 m away from Oba's market adjacent to the King palace extension. These two markets are collecting points for food commodities and textile fabrics. However, the Ijebu market is situated 1 km away from Oba's palace main gate; it is majorly for the selling and buying of domestic's animals, birds, and herbal medicine; food commodities can also be purchase in the market.

Study Population

The study population consisted of apparently healthy male and female market traders in Owo Township

Sampling Procedure

The multistage sampling method was used in the selection of markets for the study in Owo Township. Three (3) markets (Ikoko market, Oba's market, and Ijebu market) were selected using a simple random sampling method. Due to the populations of traders in the markets, the Ikoko market was allotted one hundred and ten (110) questionnaires while the two other markets shared one hundred (100) questionnaires

equally. A convenient sampling method was adopted in the selection of participants for the study. One hundred and five (105) questionnaires were retrieved from the participants in the Ikoko market, while the fifty (50) participants were sampled from each Oba's market and Ijebu market, respectively. In total, 205 participants participated in the study.

Inclusion criteria

Healthy males and females market traders in Oba, Ijebu, and Ikoko market in Owo local government who agreed to participate in the study was considered.

Exclusion criteria

Those who did not give consent to the study and those who were ill were excluded from the study

Informed consent

Before the survey, permission was obtained from the Nutrition and Dietetics Department, Rufus Giwa Polytechnic, Owo. Verbal consent was sought and obtained for the study from the office of the chairperson (Iyaalaje) in Owo local government. Verbal consent from the participant was obtained after the objective of the study was explained to them.

Data Collection

Questionnaire

A structured, self-administered questionnaire was use to obtained data on socio-demographical characteristics, dietary habits and frequency of consumption of street foods among the market traders

Food Consumption Score

Participants were asked to recall the street food consumption in the previous seven days. Each food item was given a score of 0 to 7, depending on the number of days it was consumed.

Food Consumption Score Analysis

Food items were grouped according to different food groups and the frequencies of all the food items surveyed in each food groups were summed up. Any summed food groups frequency value over 7 was recorded as 7. Each food group was assigned a weight, reflecting its nutrient density, food consumption score was calculated by multiplying each food group frequency by each food group weight, which are then summed into one composite score. Score 0 to 28 were regarded as poor food consumption; while score between 28 and 42 were regarded as borderline food consumption and score greater than > 42 were considered as acceptable food consumption.

Anthropometric measurements

Anthropometric measurements such as height, waist and hip circumference were taken, while Waist-Hip Ratio (WHpR) and Waist to Height (WHtR) was all calculated to determine the anthropometric status of the respondents.

Table 1

Food group	Weight (A)	Days eaten in past 7 days (b)	Score =A*B
Cereals, tubers and root crops	2	7	14
Pulses	3	1	3
Vegetables	1	2	2
Fruits	1	0	0
Meats and fish	4	0	0
Milk and milk products	4	1	4
Sugar and fruits drink	0.5	4	2
Oils, fats and butter	0.5	2	1
Composite score			26
World Food Programme, 1996			

World Food Programme, 1996

Height measurements

The height of the participants were measured using Standiometer with the subject standing erect and barefooted on the height meter with back to the height meter and looking straight in a Frankfurt position. The height was taken and recorded to the nearest 0.1cm (12, 13).

Waist and Hip measurement

Waist circumference measurement was taken in line with the WHO protocol using a non-stretch tape measure (Butterfly, China), the tape rule was placed at the midway between the lower rib margin and iliac crest. Measurements were taken and recorded to the nearest 0.1cm (14, 15). Hip Circumference measurement was taken by placing the tape horizontal plane around the hip at the point of the greatest circumference with the measurement taken to the nearest 0.1cm (14, 15).

Anthropometric Indices Measured

Truncal obesity was determined with Waist –Hip-Ratio (WHR) and waist circumference (WC). Waist –Hip- Ratio (WHR) was calculated by dividing the waist circumference by the hip circumference. WHR >0.85 for females and >0.95 for males were considered as abnormal while lesser values were regarded as normal (14, 15). Abnormal WC was defined as WC >102 cm for males and 88 cm for females while lesser values will be normal (14, 15). Normal Waist-Height ratio (WHtR) was defined as <5 for both male and females while the abnormal WHtR was defined as ≥0.5 (16).

Statistical Analysis

Statistical analysis was performed using the statistical package for social science (SPSS version 20). Descriptive statistics such as frequencies and percentages were used to analyze socio-demographic characteristics and all anthropometric data. For the inferential statistics, Chi-square test was used to test the association between the variables while level of significance was set at $p<0.05$.

Results

Socio- demographic characteristics of the respondents

Table 2 showed the socio-demographic characteristics of the study participants. A total of 205 respondents participated in the study. Female respondents (56.4%) were made up of more than half of the total population. The result revealed that most (30.2%) of the market traders were within the age group of 30-39 years. A good number of the respondents were married (57.6%), while approximately 27%% had between 4 and 6 children. Furthermore, Christianity was the predominant religion practiced by many (67.3%) of the respondents. About 53.2% were Yoruba while on educational attainment, 46.3% of the respondents had ND/NCE certificate, 27.8% had secondary education certificate. Only 6.3% had HND/B.Sc. degree certificate. On monthly allowances, the average monthly income of 41.5% of the respondents was less than N50, 000, 27.3% earned between N51- N100, 000, 2.9% and 7.8% of the respondents didn't indicate the amount they earned as at the time of this study.

Dietary Habit/Intake of the respondent

The dietary habits of the respondents are presented in Table 3 which revealed that majority of the respondents eat breakfast (52.7%) between 6-8am. Majority (61.0%) of the respondents skipped meals while 39% does not skipped meals. The most highlymeal skipped by respondents was breakfast (73.6%) followed by lunch (18.4%). Most of the respondents take their dinner between 6-8pm (62.0%). Most of the respondents eat their dinner between 6-8pm (62.7%). Most (90.7%) eat vegetables and 7.3% does not eat vegetables. Almost 60% which represent more than half of the respondents eat vegetables 23days in a week and the least recorded was 6 days (0.5%). Furthermore 67.7% eat fruits everyday while 32.2% does not eat fruits every day.

Table 2: Socio-Demographic Characteristics of the Subjects

Variables	Frequency (N=205)	Percentage (%)
Sex		
Male	91	44.4
Female	114	55.6
Total	**205**	**100.0**
Age (years)		
20 –29	50	24.4
30 – 39	62	30.2
40 – 49	50	24.4
50 – 59	30	14.6
> 60	13	6.4
Total	**205**	**100.0**
Marital Status		
Single	50	24.4
Married	118	57.6
Divorced	28	13.7
Widow	9	4.4
Total	**205**	100.0
Religion		
Christian	138	67.3
Islam	54	26.3
Others	13	6.3
Total	**205**	**100.0**
Tribe		
Yoruba	109	53.2
Igbo	41	20.0
Hausa	29	14.1
Ebira	**26**	12.7
Total	**205**	**100.0**
Educational qualification		
PSLC	40	19.5
SSCE	57	27.8
ND/NCE	95	46.3
HND/BSC	13	6.3
Total	**205**	**100.0**
Number of children		
1-2	79	62.7
3-4	55	26.8
5-6	55	26.8
>7	16	7.8
Total	205	100.0
Average monthly income		
₦10, 000 – ₦50, 000	85	41.5
₦51, 000 – ₦100, 000	56	27.3
₦151, 000 – ₦200, 000	27	13.2
>₦200, 000	16	7.8
Total	**205**	**100.0**

Table 3: Dietary habits of the respondents

Variables	Frequency (N=205)	Percentage (%)
Time of breakfast		
6-8am	108	52.7
9-10am	87	42.4
11-12am	10	4.8
Total	205	100.0
Skipping of meals		
Yes	125	61.0
No	80	39.0
Total	205	100.0
skip meals		
Breakfast	92	73.6
Lunch	23	18.4
Dinner	10	8.0
Total	125	100.0
Usual Time for dinner		
6-8pm	127	62.7
9-10pm	66	32.2
11-12pm	12	5.9
Total	205	100.0
Eat vegetables		
Yes	186	90.7
No	19	9.3
Total	205	100.0
Time in a week for eating vegetable		
1 day	53	25.9
2-3 days	122	59.5
4-5 days	12	5.9
6 days	12	5.9
Everyday	6	2.9
Total	205	100.0
Consumption of fruits every day		
Yes	139	67.8
No	66	32.2
Total	205	100.0

Food consumption score for the respondents

Food consumption score for the respondents is represented in Table 4. Majority of the respondent of about 56.1% meet the acceptable food consumption score, 34.1% were at the borderline and 9.8% had poor food consumption score

Table 4 Food consumption score of the respondents

Food consumption score	Frequency (N=205)	Percentage (%)
Poor	20	9.8
Borderline	70	34.1
Acceptable	115	56.1
Total	205	100.0

Anthropometric Status of the Respondents

Anthropometric status of the respondents has revealed by waist- hip ratio shows that about (61.5%) of the entire study population had normal WHR while (38.5%) were found to have a high fat accumulation. Likewise the prevalence of central obesity was higher among female respondents about (58%) compared to their males counterpart (14.3%) and it was statistically significant ($p<0.05$), while (68.3%) of the participants had normal waist circumference according to WHO classification. Judging with waist to height ratio, a total of 52.2% had normal waist to height ratio while 47.8% were obese as at the collection of this data.

Discussion

The result of this study showed that half of the respondents were within the reproductive age within the range of 20-39 years and were married. More female participated in the study compared to male traders. This established that females are more into market trading in Owo. Majority of the respondents had one form of educational certificate or the other with National Diploma/National Certificate in Education (46.3%) accounting for a higher proportion. The level of National Diploma/National Certificate Education reported in this study is similar to 48% reported among a group of market men and women in Ikosi-isheri, Lagos state (16). Christianity is a predominant religion practiced by many (67.3%) of the respondents. Having higher number of the participants who claimed to be Christians could be attributed to the fact that Owo city is a Christian dominating city in the south western part of Nigeria. This trend had also been observed among police officers (93%) in Owo local government (17).

Two-third (62.7%) of the respondents in this study ate their dinner between the hours of 6-8pm and this showed that many market traders eats dinner early while 36.9% eats dinner late. This unhealthy habit complicates poor glucose management and prevent proper night sleep (18). The meals usually missed by most of the respondents were breakfast and lunch and marketing activities during early morning and afternoon were cited as the major reasons for the skipping of meals. The role of traders in carrying out household chores coupled with their income generating activities may point to the fact that they may not have the time for food preparation at home in the morning. Even when they do prepare the meals, their busy schedule may not allow them partake of such meals. Ming *et al*. (19) noted that breakfast is the most important meal of the day that replenishes the body and brain after a night's fast. Skipping of breakfast by the traders may mean that they may tend to over eat at the next meal and this might make them add weight. The percentage of the respondents who did not eat

Table 5: Anthropometric Status of the Respondents

Anthropometrics parameters	Male (n=91) (%)	Female N=114) (%)	Total (n=205) (%)	X^2	P value
Waist circum ference					
<88cm<102cm(Normal)	79(86.9)	61(53.5)	140(68.3)	221.76	0.002*
>88cm >102cm(Excess)	12(13.1)	53(46.5)	65(31.7)		
Waist-Hip Ratio					
<0.85<0.90(Normal)	78(85.7)	48(42.1)	126(61.5)	222.62	0.003*
≥0.85≥0.90 (Excess)	13(14.3)	66(57.9)	79(38.5)		
Waist-Height Ratio					
<0.5 (Normal)	63(69.2)	44(38.6)	107(52.2)	18.771	0.001*
≥0.5 (Excess	28(29.8)	64(56.1)	92(44.8)		

*Significant at P<0.05)

fruits (32.2%) was high when compared to numerous health and protective benefits which can be supplied from fruit consumption. About 67.8% of the respondent in this study regularly eat fruits contrary to the observation of Fadupin et al. (20) among teachers in Ibadan, Oyo state where 31.2% of the study population regularly consumed fruits. Studies have shown that the consumption of fruits does not only form a formidable parts of the diet, it is associated with a lowered risk of degenerative disease such as obesity, cancer, cardiovascular diseases, cataract, brain and immune dysfunction (21). About 400 g of fruits and vegetables (5 portions) are recommended per day (22, 23). The high rate (90.7%) of consumption of vegetables consumption could be attributed to the availability in the market and the fact vegetables formed a formidable soup and sauce ingredient for an average Nigerian household (17, 18). Fruits and vegetables are good source of vitamins, minerals and dietary fibre which have been known to improve health and prevent chronic non communicable disease in adulthood, such as increased impairment of glucose associated with ageing (23, 24). The Food Consumption Score indicator captures information about usual household diet, as it incorporates consumption frequency over a seven-day period. This is different from the HDDS, which only gathers information about the previous day of consumption (25). In this study, majority (56.1%) of the respondents had an acceptable food consumption score. The food consumption score is a proxy indicator of household caloric availability (1, 2). While the FCS has been validated against quantity of caloric intake, it has not been validated against adequacy of macronutrients or micronutrients (3). The rates of Overweight/Obesity as determined by abnormal values for Waist Circumference (WC), Waist-Hip Ratio (WHR) and Waist-to-height ratio (WHtR) were 31.7%, 38.5% and 44.8% respectively. All these measurements confirmed the prevalence of central obesity among the market traders in Owo. The highest rate of central obesity was observed with WHtR while the lowest was observed with WC method. The differences in the rates of obesity using these methods have been reported (26, 27, and 28). The high prevalence of central obesity in this studyas determined by WHtR method seems to contradict reports that had identified WC as themosteffectivemethod. Central obesity or truncal obesity is a condition when excessive abdominal fat around the stomach and abdomen has built up to the extent that it is likely to have a negative impact on health (29, 30). The rate of obesity reported in this study was lower than 69% reported among a group of market traders in Abeokuta (31), but higher than 16.3% reported among female traders in Ibadan (7). The differences can be attributed to the sample size of the study population. Truncal obesity is a leading risk factor of cardiovascular diseases, Alzheimer disease and type 2 diabetes mellitus (29, 30). At least 2.8million adults died each year as a result of being overweight or obese (32). A contributing factor to truncal obesity may be attributed to the fact that the study location is urban where there is likely high intake of western diet and change in local dietary patterns due to urbanization (33,34).

The percentage (31.7%) of market trader with high abnormal waist circumference in this study was lower than (49.7%) which was reported among health workers tertiary hospital in Lagos (35). The prevalence of central obesity as determined using waist circumference was significantly higher among the female market traders than their male counterparts. This showed that the female market traders in the study location are more at risk of metabolic syndrome than the male market traders ($p<0.05$). It has been reported that women who have waist circumference >88cm are at higher risk of developing hypertension, diabetes, elevated cholesterol levels and cardiovascular diseases (32, 36). Considering the waist- hip ratio of the respondents, it was observed that about (38.5%) had visceral fat. The waist- hip ratio is thought to be a good measure of abdominal adiposity because of the distinct physiologic characteristics of different fat depots, and this was more significant among the female respondents.

Visceral fat has a lower threshold for lipolysis relative to subcutaneous fat and free-fatty acids released by the liver. In this way, their metabolic consequences could be accentuated (37, 38).

Conclusion

This study found a high prevalence of truncal obesity and high or acceptable food consumption score level among the market traders in Owo. This was more pronounced among the female marketers than their male counterparts. Skipping habit and late eating of dinner was very high among the traders most especially breakfast. More than thirty percent don't consumed fruits among the participants suggesting that this set of traders may be suffering from micronutrient deficiency which is associated with various chronic diseases.

Acknowledgement

Sincere appreciation goes to the Iyaalaje General of Owo Local Government Area of Ondo state, who coordinated the markets Iyaalajes in each market to give their maximum support for the success of the study

Declaration of conflict of interest

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

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