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THE PREVALENCE OF OBESITY AMONG FEMALE TEACHERS OF CHILD-BEARING AGE IN GHANA

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ABSTRACT

Obesity has increasingly become a public health problem in both developed and developing countries. In Ghana, the prevalence of obesity has been found to be high particularly among women. The rising trend of obesity in Ghana is worrying as studies have shown an increased risk of morbidity, disability and mortality associated with obesity. This study examined the prevalence of obesity among Ghanaian teachers of child-bearing age. A cross-sectional survey was conducted on 400 female teachers between the ages of 18 and 49 years from two sub-metropolitan areas in Accra District, Ghana. A questionnaire was used to gather information on the socioeconomic status, body mass index (BMI), waist-to-hip ratio (WHR), alcohol intake, physical activity and food intake. Appropriate statistical methods were used to determine the association between variables. The mean age, BMI and WHR were 35.9 ± 8.2 years, 27.2±5.3 kgm^{-2} and 0.79±0.07 respectively. About 34% of the women were overweight while 27% were found to be obese with 17.8% centrally-obese. The WHR ratio, however, classified majority (57%) of the women as low risk. There was a strong positive correlation between BMI and WHR with age. This means that as women aged, both BMI and WHR increased. The prevalence of obesity for a woman above 35years was about four times higher than the prevalence among the younger age group (<25years) and two times higher than that of the middle age group (26-35years). This study found that at any age group underweight, overweight and obesity co-existed. Socioeconomic variables such as marital status, income and parity showed a positive association with BMI and waist circumference. Consumption of fruits and vegetables was observed to be low among respondents. This study recommends that measures such as healthy eating guidelines supported by vigorous physical activities should be put in place in schools to help teachers maintain healthy body weights (BMI 19-25) in order to prevent the risk of obesity and its related life threatening effects.

Key words: Obesity, Prevalence, Women, Teachers, Ghana

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INTRODUCTION

Obesity is increasing at an alarming rate throughout the world [1]. A recent report by the International Obesity Taskforce (IOTF) – a collaborative programme of the International Association for the Study of Obesity (IASO) and the World Health Organization (WHO), announced the new estimate of overweight and obesity to be 1.7 billion worldwide [1]. Again, obesity has been identified as a major independent risk factor for chronic conditions such as hypertension, diabetes, hyperlipidemia and some cancers [2]. It is also clear that the distribution of body fat can increase the risk of hypertension and other cardiovascular diseases even among people with average BMI, particularly among women [3, 4]. Research conducted in seven African countries including Ghana showed that three million out of 20 million Ghanaians are overweight and obese [5]. Among these countries, Nigeria, Congo Brazzaville, Liberia, Senegal, Sierra Leone and Niger, Ghana recorded the highest prevalence of obesity which indicates that the situation in Ghana needs attention. There is, therefore, need to monitor this emerging trend of obesity in the country so as to find ways to reduce its high prevalence.

This article seeks to highlight the prevalence of obesity among women. It presents results of a study that focused on female teachers of child-bearing age because they constitute a homogeneous group of people as defined by their work schedule and the kinds of pressures they undergo. Teachers have a sedentary lifestyle. This is due to the fact that the nature of their work allows for more sitting during the day rather than walking or other physical activities. Females are also highly vulnerable due to the complex nature of their physiology. A woman, by her physiology has less lean mass and more fat mass and at the child bearing age, she tends to accumulate more fat due to child-birth [6]. This accumulated fat is important to provide energy for the mother to breastfeed [6]. When this accumulated fat is not shed off after child birth and after breastfeeding, over time, the overall fat mass increases and puts the woman at risk of obesity and its related problems [6]. In addition, an anecdotal report from the 2010 annual general meeting held by the Ghana Nutrition Association suggested that there is a knowledge gap on the prevalence of obesity in Ghana from the year 2005 to present. The purpose of this study was, therefore, to help bridge this knowledge gap by establishing the prevalence of obesity among female teachers of child-bearing age.

MATERIALS AND METHODS

Study Design

A cross-sectional survey was conducted on female teachers in their reproductive age bracket (15-49years) in 2006. A convenience sampling procedure was used to select teachers from schools in the Ashiedu Keteke and Garrison sub-metropolitan area in Accra [7]. A total of 58 schools were included in the study. Permission to carry out the study was granted by the Ghana Education Service, the District Education Officer and the circuit heads. In each school, the Head Teachers also granted permission for the survey to be conducted. Teachers in these selected schools who were willing to be

part of the study signed a consent form and were recruited. A woman in this study refers to a female teacher unless otherwise stated.

Inclusion/ Exclusion Criteria
Non-pregnant female teachers between the ages of 15 and 49 years who taught in the selected basic public school were included. Apparently healthy teachers were recruited. Teachers who were ill at the time of recruitment were excluded from the study. Illnesses such as malaria may affect dietary intake and may cause an individual to lose weight within a short time, which may not be a true reflection of the nutritional status of an individuals.

Sample Size
With a 95% confidence interval and a 5% margin of error, the formula $n= (Z /2m)^2$ was used in determining the sample size [8]. A sample size of 384 was obtained by this calculation. A total of four hundred female teachers were, therefore, recruited for this study. A structured questionnaire was used to gather information on the socioeconomic status, anthropometry, physical activity, dietary intake and alcohol intake.

Socioeconomic Status/Physical Activity
Information on age, educational level, marital status, income levels and parity were collected using a structured questionnaire while the physical activity levels were assessed with questions on the most frequent activity engaged in daily and the number of hours spent teaching.

Anthropometry
Weight, height, waist and hip circumference measurements were taken using standard procedures [9]. Subjects were in minimum clothing (that is all extra clothing and other accessories like wrist watches, big ear-rings, mobile phones, extra. were removed) in order to get the actual weight of individuals. Body mass index (BMI) was computed for each subject and then classified as being underweight, normal, overweight or obese according to WHO cut-off ranges [10]. Waist-to-hip ratio was computed for each subject and was classified according to WHO cut-off ranges [10].

Dietary Assessment
A 24hr dietary recall assessment method was used to collect data on the food taken over the past 24hr period using household measures (spoons, ladles, sardine tin extra.). Here subjects were made to recall all foods consumed in the past 24hours. The estimated food quantities were converted into grams and the nutrients calculated using the ESHA FOOD PROCESSOR software.

Food Frequency
The frequency of consumption of food and four alcoholic beverages were determined using a food frequency questionnaire. Subjects were made to report the average frequency of consumption of specific list of foods and alcoholic beverages in the past week preceding the survey. These were classified as high (4-7x/week), moderate (2-

3x/week) or low (0-1x/week) intakes. Some other dietary factors such as addition of salt to food at table, special diet intake and nutrient supplement intake were also assessed with a structured questionnaire.

Data Analysis

Data entry was done using Epi-info version 6.02 [11] after which statistical package for Social Sciences for Windows software package (SPSS) version 10 was used to analyze the data [11]. Descriptive tools such as means, standard deviations and ranges were used to describe continuous variables and proportions for categorical variables. Analysis of variance was used to test for differences between groups. Significant differences between three or more groups were identified using Duncan's multiple range test and the independent sample t-test was used for comparisons between 2 groups.

RESULTS

Background Characteristics of the Female Teachers

Out of the 400 female teachers enrolled in the study, 85.6% of the teachers had received training in education either from a teacher training college or a tertiary institution offering a degree in education. The remaining14.3% had no training in education. Monthly income was generally low related to the cost of living in Ghana. A majority of the teachers received monthly income between 110-200 Ghana cedis (US$1=1.4GHcedis). All graduate teachers received monthly income above 200 Ghana cedis (Table 1). The majority of the teachers were married and the divorce rate was low among the teachers (3.3%). Forty (40) % of the teachers had either a child or two children only 2% of the teacher had more than 4 children.

Mean Values for the Anthropometry Indices

The mean age of the female teachers was approximately 35.9±8.2years; the youngest teacher was 18years old (Table 2). The average weight was 70.2±14.4 kg while the average height was 160.6±5.56cm. The mean BMI was recorded as 27.2±5.29 kgm^{-2} which means that on the average the women were overweight. The average waist-to-hip ratio was 0.79±0.07 which means that on the average the teacher had low risk of developing heart related problems.

Prevalence of Obesity

About 34% of the teachers were overweight and 27% were obese (Table 3). The majority (36.8%) of the women had their BMI within the normal range. Few (2.3%) were underweight. The waist-to-hip ratio, however, classified few women (18%) as high risk while the lower risk group formed the majority (57%). As shown in Table 3, majority (89.1%) of the women above 35years were either overweight (51.5%) or obese (37.6%). For the ages between 26 and 35years, 58.3% were either obese or overweight while below 25 years, only 17.4% were overweight or obese. From the WHR, women above 35 years were centrally obese (83.8%) as compared to the other age groups. Waist circumference also classified the majority of females above 35 years at high risk (>80 cm).

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Correlation between Age and Anthropometric Indicators and other Socioeconomicvariables

Socioeconomic variables such as marital status, income and parity showed some association with BMI and waist circumference while educational level, marital status and parity showed an association with WHR (Table 4). Table 5 shows the correlation between the various anthropometric measurements with age. Age showed a positive correlation with weight, waist circumference, hip circumference, BMI and WHR. All the indices correlated positively with each other except for height which correlated positively only with waist circumference and hip circumference.

Dietary Habits and Physical Activity Pattern of Respondents

The intake of salt, special diet and nutrient supplements by respondents is summarized in Table 6. Only 5.8% of them were on special diets with many being on either diabetic or hypertensive diets (26.1%). About 29.3% of the respondents took nutrient supplements. Folic acid was the most frequently used nutrient supplement (17.2%), followed by iron (16.4%). About 79% spent 6-8 hours every day on teaching only while 19.5% did extra jobs apart from teaching (Table 7). As many as 43.8% of the female teacher said walking was the main daily physical activity. However, this was not meant to be an intentional physical exercise.

The average intakes for energy, protein, carbohydrates, fat and cholesterol per day are (1718.3 ± 744.7) kcal, (65.8 ± 42.6)g, (234.9 ± 103.3)g, (58.8 ± 42.7)g and (80.4 ± 112.3)mg, respectively, Table 2. This study found a negative correlation between nutrient intake and anthropometric data. Waist-to-hip ratio (WHR) correlated negatively with cholesterol while BMI correlated negatively with energy, protein, total fat and cholesterol intakes (Table 8). This is inconsistent as one expects the opposite situation. At the time of the study, the majority of the teachers indicated that having realised their high BMI status, they resorted to reducing their food intake. This might not have taken long enough for the effect to be realised. On the other hand, respondents who were physiologically underweight might be consuming high energy foods that did not have any effect on their BMI at the time of the study. This could explain to some extent the negative correlation observed in this study.

Apart from the consumption of tomatoes and onions which are usually used for most Ghanaian dishes, there was low consumption of fruits and vegetables as indicated by the food frequency table (Table 8). Alcohol consumption was generally low but a few teachers (1%) consumed some amount of red wine which is considered healthy due to the antioxidants it may provide.

DISCUSSION

This study revealed that female teachers of child-bearing age had a high prevalence of overweight (34%) and obesity (27%) based on BMI (Table 3). This prevalence is quite high among the women surveyed and this agrees with other studies that also showed a high prevalence of obesity among women [12, 13, 14, 15, 16]. This high

prevalence was observed because women by their physiology have more fat mass than lean mass [6]. With their physiology when their sedentary teaching lifestyle, which involves more sitting and standing rather than walking is continued, fat accumulates in their body over time and this may lead to obesity. This may explain the high prevalence of obesity as against the low prevalence of underweight cases observed (2.3%) among the female teachers in this study. The few cases of underweight teachers could be attributed to their natural physiological make-up since healthy teachers were recruited for the study.

This study also showed a strong positive correlation between all the anthropometric parameters. BMI, waist circumference, hip circumference and WHR correlated strongly ($p<0.01$) (Table 5). This indicates that BMI, WHR and waist-circumference could be used to indicate obesity as confirmed by other studies [17, 18, 19, 20, 21]. Again, there was an association between overall obesity and central (android) obesity (Table 5). This means that a woman who is described as obese as defined by the BMI methods is also likely to be centrally obese and vice-visa.

Among all the socioeconomic variables, parity and marital status had some association with BMI, waist circumference and WHR (Table 4). This confirms other studies that have shown a positive correlation between parity and anthropometry in Brazilian women and among Moroccan women [13, 23]. A possible reason for this may be that married individuals are more likely to have high parity and hence high BMI. During pregnancy and lactation, women may accumulate stored energy in their body [14, 22, 23, 24,]. If they do not engage in any active work after pregnancy, they may not lose the extra weight. Some studies have shown that women gain more weight after their first child than other women of the same age group who have no child [14, 24]. Also, married females are more likely to increase their body mass index due to the social support which may increase their income. As indicated in Table 4, there was a significant association between BMI and income level. If these situations are coupled with the nature of the teaching job, which is considered sedentary, this may eventually lead to obesity.

The prevalence of obesity for women above 35years was about four times higher than the prevalence among the younger age group (<25years) and two times higher than that of the middle age group; 26-35years (Table 3). This means that older female teachers are more likely to be obese than younger female teachers. However, the study also found that cases of underweight, overweight and obesity were not limited to a particular age group, as they run through all age groups. Similar trends were found for the prevalence of central-obesity based on WHR and waist circumference. Women above 35 years had a higher prevalence of central obesity than women below 35 years. This agrees with the significant positive correlation observed with BMI, WHR and age. This means that as one ages, both BMI and WHR increase. It shows that in this population of women, fat mass increased with age. Total body fat as estimated by BMI ($\geq 25 kg/m^2$) and visceral fat or abdominal adiposity estimated by WHR (>0.85) and waist circumference ($\geq$80cm) begin to accumulate early in the youngest age group (<25years), then peaks up around 26-35 years (Table 3). This

observation is similar to that found among Arab Gulf women [16, 22, 23, 25]. Another study conducted by Balahsen *et al*., [13] among women in Morocco found the prevalence of obesity to increase with age.

The teachers reported walking as the main activity for the day followed by sitting and standing. The high prevalence of both obesity and walking contradicts. This is because if walking was the main activity for the day then one should expect a low prevalence of obesity in this study since walking may help to reduce fat mass. On the contrary, the high prevalence of obesity observed in this study may be explained that even though more teachers reported walking as the main daily activity, it may not be enough exercise to burn or shed off fat that will lead to weight loss. It could also mean that the women overestimated their walking time as compared to their sitting and standing time. However, this study did not indicate the average distance covered and the walking activity indicated was not meant to be a vigorous physical exercise that could help lose weight. Again, there were only a few teachers (19.5%) who were engaged in extra jobs in addition to teaching, which could also mean that there was no major physical activity performed by the majority of the women apart from their teaching job. Routine exercising is recommended to be factored into the daily activities of the women and must be targeted towards burning fat that will lead to a healthy weight.

With regards to nutrient intake, this study found a negative correlation between nutrient intake and anthropometric data. This was unexpected as high nutrient intake (especially carbohydrates and fats) is generally positively correlated with BMI if vigorous exercise is not done. At the time of the study, the majority of the teachers indicated that having realised their high BMI status they resorted to reduced food intake. This could result in the negative correlation observed in this study. It was also realised that majority of the teachers were managing their weight by themselves as such avoided food totally. The 24 hour recall could not therefore capture the true nutritional intake of the teachers. In addition to this, the Food Frequency Tables (Table 8) indicated low consumption of fruit and vegetables. Teachers must, therefore, be educated on appropriate eating habit that will lower carbohydrate and protein intake but increase whole grain, fruits and vegetables.

Only 5.8% of the teachers were reported to be on special diet (diet recommended by a Dietician for specific reasons). Apart from people with dietary related diseases, observing special diet regime is considered to be a healthy eating lifestyle. This is because in general, once an individual is on a special diet, the individual is probably not taking in foods high in fat and sugar, but rather consuming whole grains in addition to fruits and vegetables. It can, therefore, be concluded that majority (94.3%) of the teachers who were not on special diet were probably not eating balanced diet. This is also supported by the finding in the study that there was low consumption of fruits and vegetables by the teachers (Table 8). In addition, majority of the women did not take any nutrient supplement; only 29.3% of them did. Nutrient supplements may help make up for the loss of important nutrients missing from an unbalanced diet.

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In general, there was a high prevalence of obesity among the teachers surveyed (27%) than the reported prevalence of 19.4 % among women in Accra district [26]. This is of interest because being overweight or obese is a risk factor for heart-related problems, which needs to be discouraged.

CONCLUSION

It is clear from this study that female teachers of child-bearing age in Accra district tend to be overweight and obese. This study found about 34% of the female teachers to be overweight while 27.0% were found to be obese and about 17.8% centrally-obese. This study suggests that physical activity programmes should be put in place in the various schools so as to help teachers maintain a healthy body weight (that is BMI 19-25) throughout adulthood in order to prevent the risk of obesity and its related life threatening conditions [27]. Another recommendation is that periodic education on healthy eating lifestyle should be held for the teachers which will emphasize on daily consumption of whole grains, fruit and vegetables, low fat, low sugar and moderate carbohydrate and protein as a way of promoting good health.

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Table 1: Background characteristics of the teachers

Characteristic	Frequency (n)	Percent (%)
Educational Level		
Untrained teacher	57	14.25
[1]Trained teacher	266	66.50
[2]Trained graduate teacher	77	19.25
Total	400	100.0
Income Level (Ghana cedis)		
11 -50	53	13.3
51-100	117	29.3
110-200	151	37.7
> 200	79	19.8
Total	400	100.0
Marital Status		
Single	123	30.8
Married	256	64.0
Divorced	13	3.3
Widowed	8	2.0
Total	400	100.0
Number of Children		
0	126	31.5
1-2	160	40.0
3-4	105	26.3
>4	8	2.1
No response	1	0.1
Total	400	100.0

[1] Teacher with a certificate in education
[2-] Trained teacher with certificate in education plus a university degree

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Table 2: Mean Anthropometric Data, Age, Energy and Nutrient Intake of Respondents

Variable	Mean ± S.D.	Range
Age (year)	35.90 ± 8.2	18-49
Weight (Kg)	70.18 ± 14.4	41.40 – 67.75
Height (cm)	160.60 ± 5.56	141.50 – 179.50
[1]BMI (kgm^{-2})	27.19 ± 5.29	16.50 – 44.54
[2]WC(cm)	84.09 ± 12.04	61.20 – 120.0
Hip-circumference (cm)	105.73 ± 10.4	78.50 -137.50
[3]WHR	0.79 ± 0.07	0.65 – 1.03
Nutrient Intake		
Energy (kcal)*	1718.3 ± 744.7	147 - 5851
Protein (g)	65.8 ± 42.6	5.72 - 410
Carbohydrate(g)	234.9 ± 103.3	7.12 - 665
Total fat(g)	58.8 ± 42.7	1.71 - 390
Saturated fat (g)	4.8 ± 20.2	<0.1 - 383
Cholesterol (mg)*	80.4 ± 112.3	<0.1 - 645
Folate (mcg)*	49.1 ± 77.0	<0.1 - 1005
Iron (mg)	19.8 ± 15.0	0.88 - 205
Sodium (mg)	319.4 ± 414.4	<0.1 - 3263
Potassium (mg)	691.8 ± 1037.1	<0.1 - 9194
Zinc (mg)	9.5 ± 6.2	0.17 - 36.90
Phosphorus (mg)	1026.7 ± 893.3	5.69 - 13956
Vitamin C (mg)	88.3 ± 88.5	0.03 - 926
Vitamin D (mg)*	2.1 ± 13.5	<0.1 - 168

[1] Body mass index, [2] Waist-Circumference [3] Waist-to-hip ratio.*Intakes were below the recommended allowance. Cholesterol requirement 300mg/day, Total fat requirements 30% of energy intake. Saturated fat is 10% of total fat intake [28]

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Table 3: Prevalence of Obesity Based on Body Mass Index and Waist-to-Hip Ratio by Age Group

Variables	n	Age (years)			
		<25	26-35	>35	Total
		n (%)	n (%)	n (%)	n (%)
[1]BMI (kgm^{-2})					
Underweight	9(2.3)	3(33.3)	4 (44.4)	2(22.2)	9(100.0)
Normal	147(36.8)	29(20.0)	60 (41.4)	56(38.6)	145(100.0)
Overweight	136(34.0)	12(9.1)	52 (39.4)	68(51.5)	132(100.0)
Obese	108(27.0)	4(8.3)	27 (18.9)	76(37.6)	107(100.0)
[2]WHR					
≤ 0.85	329(82.3)	47(14.5)	133(40.9)	145(44.6)	325(100.0)
>0.85	71(17.8)	1(1.5)	10(14.7)	57(83.8)	68(100.0)
[3]WC (cm)					
<80	164(41.0)	37(22.7)	77(47.2)	49(30.1)	163(100.0)
≥ 80	236(59.0)	11(4.8)	66(28.7)	153(66.5)	230(100.0)

Source: WHO, 1998 [1]Body mass index: < 18.5(underweight), 18.5-25 (normal), >25-30 (over weight), >30 (obese). [2]Waist-to-hip ratio: ≤0.85 (Lower risk), >0.85(high risk).
[3]Waist-circumference: < 80 (lower risk), ≥80 (high risk)

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Table 4: Association between Anthropometric Indicators and Some Variables (significant p-values)

Variables	Body Mass Index	Waist-to-Hip Ratio	Waist Circumference
Income	0.003	*	<0.001
Parity	<0.001	<0.001	<0.001
Marital Status	<0.001	0.020	<0.001
[1]Educ. Level	*	0.003	*
[2]Special Dt Int.	*	*	*
Beer Intake	*	*	*

Chi-square test P-value < 0.005. * P-value not significant (Chi-square test) [1]Educational level. [2]Special diet intake. Waist-to-hip ratio (WHR): (WHR≤ 0.85 =1; WHR> 0.85 =2). Waist Circumference (WC): (WC <80cm =1; WC>80cm=2). Income: (<1million cedis =1; >1 million cedis = 2). Parity: (No child=1; One child=2; more than two children=3)

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Table 5: Correlation between Anthropometric Indices

	Weight	Height	[1]WC	[2]HC	[3]BMI	[4]WHR
[3]BMI	0.94** <0.001	-0.03 0.605	0.91** <0.001	0.90** <0.001		
[4]WHR	0.45** <0.001	-0.06 0.243	0.74** <0.001	0.22** <0.001	0.49** <0.001	
Age	0.32** <0.001	0.03 0.532	0.46** <0.001	0.30** <0.001	0.33** <0.001	0.44** <0.001

** Correlation is significant at 0.001 level (2-tailed) * Correlation is significant at 0.05 level (2 tailed), [1]Waist-circumference, [2] Hip circumference, [3]Body Mass Index, [4]Waist-to-hip ratio

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Table 6: Salt, Special Diet Intake and Nutrient Supplement Intake of Respondents

Characteristic	Frequency (n)	Percentage (%)
[1]**Special diet intake**		
Yes	23	5.8
No	377	94.3
Total	400	100.0
[2]**Type of special diet**		
Diabetic/low sugar diet	6	26.1
Pepper-free diet	4	17.9
Hypertensive/low salt diet	6	26.1
Low fat/cholesterol diet	2	8.7
Low protein	2	8.7
Weight reduction diet	3	13.0
Total	23	100.0
Nutrient supplement intake		
Yes	117	29.3
No	283	70.5
No responses	1	0.3
Total	400	100.0
Nutrient supplement used		
Calcium	6	5.2
Iron/blood tonic	19	16.4
Multivites	18	15.5
Zinc	6	5.2
Folic acid	20	17.2
[3]Vitamin capsules	15	12.9
Centrum	1	0.9
Cod-liver/omega -3	5	4.3
More than two supplements	19	16.4
[4]Others	7	6.0
Total	116	100.0

[1] Respondent who have been put on dietary treatment by a dietician or a physician.
[2] Denominator is 23. [3]Vitamin supplement such as B-complex, vitamin-E etc.
[4]These include other nutrient supplements such as Kingdom Garlic, Forever-Living

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Table 7: Working Hours and Physical Activity Levels of Respondents (n=400)

Characteristic	Frequency (n)	Percentage (%)
Hours spent teaching/day		
1-5 hrs	67	16.8
6-8 hrs	316	79.0
>8 hrs	16	4.0
No response	1	0.3
Total	400	100.0
[1] **Extra job apart from teaching?**		
Yes	78	19.5
No	322	80.5
Total	400	100.0
[2]**Main daily activity**		
Sitting	108	27.0
Standing	101	25.3
Walking	175	43.8
Driving	7	1.8
[3]House keeping	4	1.0
Sleeping	4	1.0
No response	1	0.3
Total	400	100.0

[1]Respondents who engage in other type of work in addition to teaching
[2]Main activity of respondent in line with teaching
[3]Activity such as; washing, sweeping, cooking and general cleaning around the house

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Table 8: Frequency of consumption of fruits, vegetables and alcoholic beverages and Correlation between nutrient intake and Anthropometric data

Frequency of Consumption of Selected Foods and Alcoholic Beverages (%)

Food	0-1x/week	2-3x/week	4-7x/week
Carbohydrates			
Rice	14.8	44.5	40.8
Yam	56.3	38.0	5.8
Cocoyam	97.6	1.8	0.8
Gari	82.3	5.3	2.0
Proteins			
Fish	4.0	19.3	76.8
Egg	59.6	29.8	1.8
Poultry	64.3	24.3	11.5
Fat/oils			
Vegetable oil	20.0	43.5	36.6
Palm oil	27.8	44.8	27.6
Butter	93.8	4.0	2.3
Fruits/Vegetables			
Orange	39.8	31.5	28.8
Pineapples	74.0	17.8	7.3
Apple	72.3	13.8	4.0
Garden Eggs	35.8	38.5	25.8
Kontomire	23.7	7.5	1.6
Okro	69.5	24.5	6.0
Alcohol			
Red wine	96.3	2.5	1.3
Stout	97.6	1.8	2.6
Beer	98.6	1.0	0.6

Correlation between Nutrient Intake and Anthropometric data

	[1]BMI	[2]WHR	Weight	[3]WC
Calories	-0.138** 0.006	-0.047 0.352	-0.122** 0.015	-0.125* 0.012
Protein	-0.128* 0.010	-0.045 0.372	-0.108* 0.031	-0.107* 0.033
Carbohydrate	-0.087 0.082	-0.032 0.524	-0.084 0.093	-0.090 0.071
Total fat	-0.146** 0.003	-0.065 0.197	-0.128* 0.010	-0.135** 0.071
Saturated fat	-0.025 0.625	0.000 0.994	-0.037 0.464	-0.015 0.770
Cholesterol	-0.113* 0.016	-0.190** 0.000	-0.094 0.064	-0.146** 0.004

** Correlation is significant at 0.001 level (2-tailed) * correlation is significant at 0.05 level (2 tailed),

[1]Body Mass Index, [2]Waist-to-hip-ratio, [3]Waist-circumference, [4]Hip-circumference

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