Prevalence of Overweight, Obesity and Associated Risk Factors among Women of Reproductive Age in the Kanifing Municipality, The Gambia

James-Akinsulure, V.O.[1]
Cham, M.K.[2] and
Uyamadu, E. A.[3]

1Gambia College School of
 Education, Brikama,
 The Gambia

2MD, MCommH, FWACP.
 Gambia Medical and
 Dental Council, Brusubi,
 The Gambia

3School of Medicine and
 Allied Health Sciences,
 Department of Public and
 Environmental Health,
 University of The Gambia

 E-mail: chamk46@yahoo.co.uk,
     chamkabir@gmail.com,
     euyamadu@utg.edu.gm

Corresponding Authors:
As above

Keywords:
Prevalence, Overweight,
Obesity, Risk factors,
Reproductive age women

Mots clés:
prévalence, surpoids,
obésité, facteurs de risque,
femmes en âge de procréer

Abstract

The increasing prevalence of overweight and obesity is a critical public health problem for women of reproductive age. The main objective of the study was to determine the prevalence of overweight and obesity as well as associated risk factors among women in Kanifing Municipality, in The Gambia. A cross-sectional design was used. Data on socio-economic factors of the women, their physical activity and dietary intake patterns, as well as anthropometric measurements were collected from 150 women aged 15-44 years from twelve wards, using the convenient sampling method. Two indicators [body mass index (BMI), and waist circumference] were used to determine the prevalence of overweight and obesity. Data were analysed using the SPSS Software. Analytical statistics test was done using Chi-square with the significant level of 95%. The combined prevalence of overweight and obesity was high using the two indicators (40.7% by BMI and 41.3% by waist circumference). Age and parity were significant predictors of overweight and obesity. There were significant differences between the mean values of the indicators at different physical activity levels (P<0.05). The combined prevalence of overweight and obesity increased as the number of hours spent on sedentary behaviour increased. Frequency of consumption of nearly all foods was not associated with overweight and obesity by BMI and waist circumference (P>0.05). The findings have shown an evidence of the rising trends of overweight and obesity among women in urban areas of The Gambia. Efforts should be made to address the problem of overweight and obesity.

La Prévalence du surpoids, de l'obésité et des facteurs de risque associés chez les femmes en âge de procréer dans la municipalité de Kanifing, Gambie

Abstrait

La prévalence croissante du surpoids et de l'obésité est un problème de santé publique critique pour les femmes en âge de procréer. Le principal objectif de l'étude était de déterminer la prévalence du surpoids et de l'obésité et les facteurs de risque associés chez les femmes de la municipalité de Kanifing, en Gambie. Une conception en coupe transversale a été utilisée. Des données sur les facteurs

socio-économiques des femmes, leur activité physique et leurs habitudes alimentaires, ainsi que des mesures anthropométriques ont été recueillies auprès de 150 femmes âgées de 15 à 44 ans de douze quartiers, en utilisant la méthode d'échantillonnage pratique. Deux indicateurs [indice de masse corporelle (IMC) et tour de taille] ont été utilisés pour déterminer la prévalence du surpoids et de l'obésité. Les données ont été analysées à l'aide du logiciel SPSS. Le test de statistiques analytiques a été effectué en utilisant le chi carré avec un niveau significatif de 95%. La prévalence combinée du surpoids et de l'obésité était élevée selon les deux indicateurs (40,7% par IMC et 41,3% par tour de taille). L'âge et la parité étaient des prédicteurs significatifs du surpoids et de l'obésité. Il y avait des différences significatives entre les valeurs moyennes des indicateurs à différents niveaux d'activité physique (p <0,05). La prévalence combinée du surpoids et de l'obésité augmentait à mesure que le nombre d'heures consacrées à un comportement sédentaire augmentait. La fréquence de consommation de presque tous les aliments n'était pas associée au surpoids et à l'obésité selon l'IMC et le tour de taille (P> 0,05). Les résultats ont montré une évidence des tendances à la hausse du surpoids et de l'obésité chez les femmes des zones urbaines de la Gambie. Des efforts devraient être faits pour s'attaquer au problème du surpoids et de l'obésité.

Introduction

Overweight and obesity are among the biggest health problems in the world (NIDDK, 2015). Overweight and obesity are linked to more deaths worldwide than underweight. Globally there are more people who are obese than underweight – this occurs in every region except parts of Sub-Saharan Africa and Asia (WHO, 2020). They are associated with many other diseases, which combined, kill millions of people per year (Authority Nutrition, 2014). Studies have shown that the prevalence of overweight and obesity in the developing countries including The Gambia is increasing in all age groups.

According to some data, there are wide variations in the prevalence of overweight and obesity throughout the world, ranging from India, where one percent or less of the population is obese, to the Pacific Islands, where the prevalence of combined overweight and obesity can reach up to 80% in some regions (Nguyen and El-Serag,

2010). Overweight and obesity are linked to more deaths worldwide than underweight.

Obesity rise was initially limited to developed countries but recent global figures indicate that it is increasing in the developing world (Bhurosy and Jeewon, 2014). This has made World Health Organization (WHO) to emphasize the importance of monitoring the prevalence and secular trends for overweight and obesity in each country (WHO, 2013).

The prevalence of obesity among men and women varies greatly within and between countries. According to Kanter and Caballero (2012), gender disparities are exacerbated among women in developing countries, particularly in the Middle East and North Africa. In 2016, it was recorded that 39% of men and 39% of women 18 years and above were overweight (WHO, Global Health Observatory, 2016).

In middle-aged women, the biological factor and hormonal changes affects fat distribution that may increase the risk or negative effects of obesity

on health (Kulie *et al.*, 2011). These biological and related socio-cultural differences warrant specific study on women. Understanding how regional body mass indexes are changing in women, and the relative speed at which this is occurring, is important for health planning policy and intervention (Kulie *et al.*, 2011).

Few studies have explored this topic in middle-aged women. Identifying the important determinants of overweight and obesity may help to define target groups for prevention. This study is designed to determine the prevalence of overweight and obesity in a group of reproductive age Gambian women and comparing the result with other previous studies. This study also examined the associations of overweight and obesity with demographic and socioeconomic characteristics.

In 2016, female obesity prevalence for Gambia was 14.8%. Female obesity prevalence of Gambia increased from 6.5% in 1997 to 14.8% in 2016 growing at an average annual rate of 4.43% (Knoema, 2017). In view of this, the study sought to determine the current prevalence of overweight and obesity and the associated risk factors among women of reproductive age in Kanifing Municipality, in The Gambia.

Materials and Methods

Description of the Study Area
The study was conducted within Kanifing Municipal Council, in The Gambia. According to the 2013 National Population and Housing Census (preliminary report), Kanifing Municipality has a total population of 382,096 and accounts for 20.3% of the national population. This shows a drop of 3.42 % over the 2003 Population and Housing Census, which represented 23.72% of the National Population. The Council is one of the two local government areas of the former Banjul Region. It covers nineteen wards. The municipality is one of the most populous divisions in the country. Kanifing Municipality, covering a land area of 75.5km square is located between the Island of Kombo St Mary on which Banjul, the capital city, is located and West Coast Region, the

nearest Local Government Administrative area, stretching for a distance of a little over 15km. The Municipality is bounded on the East by a long stretch of uninterrupted mangrove swamps, which extends into the West Coast Region. These mangrove swamps in the two Local Government Areas form one of the best breeding grounds for fish and other marine life along the entire African coast line. To the North and North Eastern boundary is the Atlantic Ocean terminating into beautiful beaches. The Meandering mangrove swamps and white sandy beaches serve as great attractions for tourists and earned the country the nickname 'the Smiling Coast of Africa' (KMC, 2016).

Study Design
The study employed a cross-sectional research design to study overweight and obesity in urban Gambia. The study was descriptive in that the prevalence of overweight and obesity was calculated as well as the associated risk factors for overweight and obesity among the women in the study.

Target Population and Sample Size
The target population for this study was women within the age bracket 15 – 44 years and the sample size was 150.

The sample size was computed using single proportion sample size formula:

Where; $$n = \frac{p(1-p)(z_\alpha)^2}{e^2}$$

n = Total Sample Size (n = 150)
p = Proportions of the samples from the population (10.77%)
Z_a = Confidence interval (95% I.C = 1.96)
e = Margin of error (5% or 0.05)

This formula was used because it is appropriate in the calculation of sample sizes of known and unknown proportion of the study populations. The age group was chosen because most women tend to gain weight within this period. Table 1 shows the data for this age bracket in Kanifing Municipal Council, in The Gambia:

Table 1: Data of women aged 15 to 44 years in Kanifing LGA

Age group	Female	Total
15-19	23,088	**23,088**
20-24	23,464	**23,464**
25-29	19,780	**19,780**
30-34	14,465	**14,465**
35-39		**10,695**
40-44	7,420	**7,420**
Total	**98,912**	**98,912**

Source: Gambia Bureau of Statistics (GBoS), 2016.

Sampling Procedures

A simple convenient sampling method was used to obtain the total number of women required (i.e., 150 women). In order to select the sub-locations, all the sub-locations were aggregated and the lottery method was used to select ten namely: Tallinding, Latrikunda Yiringhanya, Fajikunda, London Corner, Kololi, Bakau New town/Fajara, Kanifing, Latrikunda Sabiji, Bundung Bantaba/Borehole, and Dippakunda. A researcher randomly picks numbers, with each number corresponding to a subject or item, in order to create the sample. This involved writing the names of each ward on a small sheet of paper and folded very well. The researcher ensured that the papers were well mixed before selecting the sample population. The simple random sampling method was also used to select the respondents from each sub-location. Each of the locations was given equal representation until the total number of women to be selected per sub-location was reached. Any female from ages 15-44 years, non-pregnant, residing within Kanifing Municipality at the time of data collection, and willing to participate in the study was selected. Also any female below 15years or above 44 years, pregnant, not residing in Kanifing Municipality at the time of data collection, and not willing to participate in the study was selected.

Data Collection Tools

The main research instrument for data collection was an interviewer-administered structured questionnaire. The questionnaire was divided into four parts. The first part was used to collect socio-demographic and socio-economic status data. The second part was used to collect data on physical activity during work, transportation and leisure time in a typical week. The third part was used to collect information on dietary intake and feeding habits. This was done using the Food Frequency Questionnaire. The final part of the questionnaire was used to collect anthropometric data (weight, height, and waist circumference).

Data Collection Procedures

The socio-demographic part of the questionnaire involved asking the respondents about their age, marital status and parity, while the socio-economic status questions elicited the following information: area of residence, income status, main occupation, type of dwelling, fuel used for cooking, sources of income and monthly expenditure on selected items, water source and ownership/possession of various household items. These household items included TV, Radio, refrigerator, cooker (with oven), sofa set, microwave, home computer, mobile phone, landline, land/plot, and a vehicle.

The physical activity part was used to collect data on type, frequency, duration and intensity of physical activity during work, transportation and leisure time in a typical week. Data on physical activity were collected using the "Global Physical Activity Questionnaire (GPAQ)". This is a tool that was developed by WHO for physical activity surveillance in countries. This instrument has mainly been developed for use in developing countries. The GPAQ has undergone a research programme which shows that it is valid and reliable, but also adaptable to incorporate cultural and other differences and has been validated in nine countries hence its use for this study.

Dietary intake data was collected using a 7-day food frequency questionnaire. The food frequency questionnaire was used to obtain information on the type of foods consumed by the respondents in the preceding seven days and the frequency of consumption of those foods. Various foods from different food groups were read out to the respondents, who in return were required to state

the number of times they had consumed food in the preceding seven days.

In addition, the respondents were asked to provide information on the following: type of fat/oil used for cooking, preferred cooking method, meal consumption patterns in the preceding three months and the number of times food was eaten away from home.

Anthropometric measurements of height, weight, and waist circumference were taken to determine nutritional status. Height (in metres) was measured using three wooden calibrated height scale which were mounted on each other, and each respondent was asked to stand on a flat surface. A wooden head rest was placed on the head, which allowed the measurement to be taken at the point perpendicular to the top of the head.

Weight was measured to the nearest 100 grams (0.1kg) using both digital and analogue bathroom scales, after removal of shoes and excess clothing. Both weight and height were taken twice. In order to ensure quality data, the weighing scale was calibrated before measuring of weight began every day and after every five measurements during the measuring exercise.

Waist circumference was measured using a non-stretchable tape halfway between the lower border of ribs and the iliac crest and the middle of the navel on a horizontal plane, while ensuring that the tape was level around the body and parallel to the floor. The tape was tightened around the body without depressing the skin. Two measurements to the nearest 0.5cm were taken and the mean recorded.

Method of Data Analysis
The completed questionnaires were analysed using SPSS computer software. The data were first inputted using Microsoft Office Excel Worksheets and then exported into the SPSS program for further analysis. Chi-square tests were performed to establish the association between categorical variables like age group, marital status, and water sources. ANOVA was used to compare the means for age, income, expenditure, anthropometric measurements and the mean nutrient consumption. Both descriptive

(mean, standard deviations, frequencies, and percentages) and inferential statistics were used to describe quantitative data and to examine the relationship between overweight and obesity.

Results

Socio-demographic Information of the Respondents
The demographic characteristics of the children is shown in Table 2. Results show that the minimum age of respondents was 15 years and the maximum age was 44 years with the mean age of 27.89, and the range of 29 . There were more women in the second to the youngest age-group (20-24years) and they were made up of more than one third of the total sample (37.3). The age group with the least number of participants was 35-39 years (8.0 %).

Majority of the respondents were single 86(57.3%), followed by 59(39.3%) who were married. The percentage of respondents who were either divorced or separated was 2.7% and the least was 0.7% widowed. Majority of the respondents (85.4%) had 0-3 children (out of which 90% has no birth at all) while those who had 4 or more children were 14.6%. More than two thirds of the women had either completed secondary school or gone to college. However, the lowest level of education (no education and primary incomplete) was 15.3%. The main occupations were casual work, self-employment, formal or regular employment, full time housewife, and any other occupation as identified by the respondents. Overall, over a third of the women in the study were in formal/ regular employment, 59 (39.3%), followed by any other occupation, 56 (37.3%), majority of whom were students. The casual workers were 8.3% with housewives and the self-employed making up 7.3% each (which are the least) of the study population. Majority, 70 (46.7%) of the women lived in houses which belong to family (parents or other relatives. Nearly half of the women lived in houses that had 1-3 rooms and only 13.3% of the respondents lived in houses with 7 or more rooms. The trend observed was that majority of respondents

Table 2: Demographic and selected socio-economic characteristics of the women

Variables	Frequency	Percentage (%)
Age group (years)		
15-19	13	8.6
20-24	56	37.3
25-29	29	19.3
30-34	20	13.3
35-39	13	8.0
40-44	19	12.6
Marital status		
Single	86	57.3
Married	59	39.3
Divorced/separated	4	2.7
Widowed	1	0.7
Education		
None	9	6.0
Adult literacy	5	3.3
Primary incomplete	9	6.0
Primary complete	8	5.3
Secondary	52	34.7
College (certificate/diploma)	57	38.0
University	8	5.3
Other	2	1.3
Occupation/employment status		
Casual	13	8.7
Self employed	11	7.3
Formal	59	39.3
Housewife	11	7.3
Other	56	37.3
Parity		
0-3	128	85.4
4-7	18	12
≥ 8	4	2.6
House ownership		
Rents	42	28
Owns	38	25.3
Other	70	46.7
Rooms in the house		
1-3	74	49.4
4-6	56	37.3
≥ 7	20	13.3
Water source		
Owns tap	107	71.3
Public tap	18	12.0
Well/borehole	24	16.0
Other	1	0.7
Cooking fuel		
Electricity	3	2.0
Gas	9	6.0
Kerosene	0	0.0
Charcoal	82	54.7
Wood	55	36.7

Table 3: Socio-economic Group by Income

Class /Range	Frequency	Percentage (%)
Lower (D500-D10,333)	142	94.7
Middle (D10,334-D20,165)	6	4.0
Upper (D20,166-D30,000)	2	1.3
Total	150	100

made use of charcoal and wood. Nearly two-third of the households (71.3%) had individual taps as their main water source, while those which relied on communal taps were 12.0%.

Table 3 shows the total monthly income of the respondents. The mean income was D5142.82 with the minimum and maximum income as D500 and D30,000 respectively. The majority of the women were within the lower class range while only 2(1.3%) of the study population were within the upper class.

Physical Activity of the Women and their Sedentary Behaviour

Table 4 shows the respondent's physical activity at work, during transport and recreation; sedentary time. The results indicated that majority of the women 133(88.7%) were involved in moderate intensity activities while only 8(5.3%) were involved in vigorous intensity activities at work. Women who neither do vigorous nor moderate intensity activities were 9(6%) of the study population. Two-third (66.7%) of the women reported to walk for at least 10 minutes per day in a typical week. Only a small percentage of the women engaged in both vigorous and moderate recreational activities with 4.6% each. Majority of the women 135(90%) did not do any recreational activity. The results indicated that majority of the women (92.0%) engaged in sedentary behaviour for five or more hours per day, with 73.3% of the women who spend more than 10 hours in sedentary activities per day.

Table 4: Physical activity at work, during transport and recreation; sedentary time

Physical Activity Work	Frequency	Percentage (%)
Vigorous physical activity	8	5.3
Moderate physical activity	133	88.7
	100	66.7
Transport		
Recreation		
Vigorous sports	7	4.6
Moderate sports	7	4.6
Both	1	0.7
No sport	135	90.0
Sedentary time (Hours)		
< 5	12	8
5 – 10	28	18.7
> 10	110	73.3

Dietary Intake of the Women (last 7 days)

Table 5 shows that vegetable and cereal groups of food recorded the highest consumption with 18.6% and 16% respectively while the legumes as well as root and tuber groups had the least consumption, 6.0%. The results also indicated that white rice and bread were the main staples consumed by the participants. Among the dairy products, whole milk registered the highest frequency of consumption (92.2%) while the most consumed meats were fish and chicken, which were consumed by the majority of the women. There were significant differences in the frequency of consumption of nearly all foods (P<0.05).

Table 5: Prevalence of consumption (%) of the food groups in the preceding 7 days

Food group	Frequency	Percentage (%)
Cereals	24	16.0
Roots and tubers	9	6.0
Dairy foods	15	10.0
Animal and animal products	15	10.0
Legumes, pulses and nuts	9	6.0
Vegetables	28	18.6
Fruits	16	10.6
Sugar alternatives, sweets	18	12.0
Beverages and spreads	16	10.6
Total	**150**	**100**

Prevalence of Overweight and Obesity by BMI and Waist Circumference

The prevalence of overweight and obesity was determined using two methods, namely: BMI and the waist circumference. The combined prevalence of overweight and obesity in this study was 40.7% and 41.3% by BMI and waist circumference respectively, while the prevalence of obesity was 19.3% and 26.0% by BMI and waist circumference respectively.

The mean BMI was 24.36 kg/m^2. This means BMI falls in the normal weight category (18.5-24.49 kg/m^2) while the mean waist circumference was 79.0cm which is also classified in the normal category. These results indicate that the study population had more normal anthropometric values than those considered overweight and obese (using the two indicators); nevertheless appreciable number of the women in the study could be pre-disposed to the co-morbidities associated with being overweight or obese.

Table 6: Prevalence of Overweight and Obesity by BMI and Waist circumference

Nutrition status	BMI N (%)	WC N (%)
Underweight	28(18.6)	**
Normal weight	61(40.7)	88(58.7)
Overweight	32(21.3)	23(15.3)
Obese	29(19.3)	39(26)
Combined overweight & obesity	61(40.7)	62(41.3)

Source: WHO (2000); American Council of Exercise (2010). WC= Waist circumference; BMI= Body Mass Index
** No cut offs available for women with very low waist circumferences, hence the normal waist circumference in the table includes those who had very low waist circumferences.

Discussion

The report has presented the main findings of a research project which focused on the prevalence of overweight and obesity as well as risk factors such as socio-economic factor, physical activity and dietary intake. The study looked at the relationships that exist between these variables.

The prevalence of overweight and obesity in this study corroborates the findings of other

studies that indicate a rise in the prevalence of overweight and obesity in Sub-Saharan African urban areas, especially among women (Neupane et *al*., 2016, Amugsi *et al.,*2014, Mangemba, & San Sebastian, 2020 and Mbochi., 2010). The combined prevalence of overweight and obesity in this study (by BMI) was 40.7% which is nearly three times of that reported in 2016, which was 14.8% nationally. The prevalence of combined overweight and obesity in this study is higher compared to results by Chowdhury *et al.,*(2018) which found a prevalence rate of 28.37% by BMI in an urban population in Bangladesh. Also Addo *et al*., (2015) reported an overall prevalence of obesity and overweight among the bank workers to be 55.6 %. Abdominal (or central) obesity (waist circumference measurement equal to or more than 88cm) was higher in the Christensen study which found a prevalence rate of 46.6% of abdominal obesity rate (waist circumference $\geq$ 88cm) among women in Nairobi. In another study in Northwest China (Song *et al*., 2019), the mean waist circumference in a female population was 88cm, which was close to the mean waist circumference measurements of women in this study (87 cm). This may be an indication that both overall and abdominal obesity may be high in KMC, and probably in other urban areas in the Gambia, which could predispose the women to the co-morbidities associated with central obesity. Studies to determine the risk of co-morbidities associated with the waist circumference measurements are lacking in The Gambia, hence the study relied on the WHO sex specific waist circumference measurements which are used to assess the risk of metabolic complications of Caucasians.

Marital status was significantly associated with the mean BMI and waist circumference. Single women (those never married) had the least values for BMI save one, and waist circumference compared with the other groups of marital status. The married women had higher BMI than the single ones. These results could be partly attributed to age. Single women were generally younger than their counterparts in the other categories of marital status. The number of births per women

was used to establish the relationship between parity as well as overweight and obesity. In this study, nulliparous women exhibited smaller values in all the anthropometric measurements compared with parous women. There was no significant association between the highest educational level and the prevalence of overweight and obesity by all the three outcome variables. Similarly, no association was found between the types of occupation and the mean BMI as well as the waist circumference measurements of the women.

Studies in developed countries show an inverse (negative) relationship between education and obesity, particularly among women: the lower the education or the social class, the higher the prevalence of obesity. It was surprising that occupation was not related with overweight and obesity by the two indicators. While these findings are contrary to what was expected, it is possible that occupation by itself may not be important for the study population as far as weight gain is concerned.

The activities that people engage in during work on the other hand may be more important for this study population as they determine the time and energy spent on work-related physical activity and sedentary time. The physical activity levels and the sedentary behaviour (time spent sitting in atypical day) were used to investigate this relationship using the ANOVA analysis. The mean values for the two outcome variables (BMI and waist circumference) increased as the activity levels decreased. There were significant differences between the mean values of the indicators at different physical activity levels (ANOVA, P<0.001 by BMI and P=0.030 by waist circumference). At the high level category of physical activity, the women's mean values for BMI and waist circumference were significantly lower and increased as the physical activity levels reduced.

With regard to sedentary behaviour (total time they spent sitting or reclining on atypical day) the relationship was significant by BMI (P=0.014). The combined prevalence of overweight and obesity increased as the number of hours spent on sedentary behaviour increased. For

instance, at more than ten hours of sedentary behaviour, the mean BMI was 25.4 kg/m^2 while at less than five hours; it was 24.3 kg/m^2.

The study found a significant association between the physical activity levels and the occupations. Women in self-employment did more physical activity and spent less time in sedentary behaviour. Most women in the study were formally employed, had lower levels of physical activity and spent more time in sedentary activities. In addition, this study has illustrated that walking was more common among women from lower socioeconomic groups, further explaining the variations in the levels of physical activity.

This study shows a much higher total physical activity (88.7% of the women in the moderate physical activity category) compared with a study by Mbochi (2010) which found a 57.8% prevalence of high physical activity among adult women in Kenya. The Bangladesh study, however, had a larger sample size (58192 women) and included women who were older (up to 49 years) in age, and has been found to be negatively correlated with the physical activity levels even in the current study whose maximum age limit was 44 years. The same physical activity tool was used in both studies.

These findings point to a need to focus on physical activity interventions as a way of preventing and controlling overweight and obesity especially among women, and to increase their overall health.

Under reporting is commonly associated with obesity. For instance, in the Duvigne and colleagues study, a significantly larger percentage of overweight/obese people, including the abdominally obese individuals were observed among the under reporters.

Studies have shown that dietary intake is one of the main factors in the development of overweight and obesity. However, the results suggest that other factors may be more critical (in this study population) than dietary intake in the development of overweight and obesity. These other factors include the socio-economic factors (age, parity, socio-economic status) and physical inactivity which were all found to have a significant association with overweight and obesity prevalence.

The study did not establish the usual intakes (quantities) of the foods listed in the food frequency questionnaire. Another possible explanation to these findings could be the consumption of similar foods by the women in the study. A look at the food frequency in the 7 preceding days shows that some foods like white rice, bread, fish, and vegetables among others were consumed by most of the women in the study while some foods registered relatively low frequency of consumption, for instance pulses. This may imply a lack of variety in the patterns of food consumption. It is also possible that women who consumed foods that are known to contribute to overweight and obesity (high fat and high sugar foods) consumed them in moderate quantities that may not be adequate to cause overweight and obesity. All in all, these findings are intriguing and call for further investigation of the dietary intake among women in The Gambia, especially over a longer period of time than was the case in this study.

The study clearly illustrates that the prevalence of overweight and obesity is gradually increasing especially among women in urban areas in The Gambia, as is the case in other urban African areas. The results are fairly consistent with the findings of other study such as that of Mbochi (2010).

More research especially of longitudinal nature may help explain further the factors associated with overweight and obesity among women in Kanifing Municipality and other urban areas in The Gambia.

Conclusion

Even though the mean BMI and the waist circumference of the women were within the healthy ranges, the prevalence of generalized abdominal overweight and obesity was high by both indicators used in the study. The majority of the women studied were within the lower socio-economic group. Although the problem has been found in all the socio-economic groups, it is most

concentrated in the upper socioeconomic group even though very few. Age and parity were found to be significant predictors of overweight and obesity in the study. Socio-economic status (number of assets and the number of rooms in the house) was also found to predict overweight and obesity, even though it was not as important as age and parity.

Therefore, these factors should be considered in developing interventions for weight management among women in KMC. The results suggest the above factors may be more critical in influencing weight gain than dietary intake in the population studied.

Therefore, the first null hypothesis that stated that "there is no significant relationship between socio-economic factors and overweight and obesity" was rejected.

Total physical activity was negatively correlated with overweight and obesity. This means that women with lower levels of physical activity were more likely to be overweight and obese. Consequently, the second null hypothesis which stated that "there is no significant relationship between physical activity and overweight and obesity" was also rejected.

The third null hypothesis which stated that "there is no significant relationship between dietary intake and overweight and obesity" was not rejected since the frequency of consumption of nearly all foods in the 7 days preceding the study was not found to be related to overweight and obesity.

This paper recommends the need for proper health education of women on the importance of physical activity and improved dietary practices. Also, there is need to create awareness on the problem of overweight and obesity especially among women in urban areas. The awareness could focus on areas like making healthy food choices. The awareness would go a long way in empowering the women to make informed choices especially when faced with a variety of unhealthy choices. Interventions on lifestyle changes should target the people in all socioeconomic groups.

References

Addo Prince Addo, Kofi M. Nyarko, Samuel O. Sackey, Patricia Akweongo, and Bismark Sarfo .(2015). Prevalence of obesity and overweight and associated factors among financial institution workers in Accra Metropolis, Ghana: a cross sectional study. BMC Res Notes. 2015; 8: 599. doi: 10.1186/s13104-015-1590-1. PMCID: PMC461.

American Council of Exercise (2010). *ACE fact sheet.* Retrieved from http://www.dietandfitnesstoday.com /body-fat-percentage-index.php

Amugsi, D.A., Dimbuene, Z.T., Mberu, B. *et al*. (2017). Prevalence and time trends in overweight and obesity among urban women: an analysis of demographic and health surveys data from 24 African countries, 1991–2014 *BMJ Open* 2017;7:e017344. doi: 10.1136/bmjopen-2017-017344.

Authority Nutrition. (2014). 10 Leading Causes of Weight Gain and Obesity (Besides Willpower). Retrieved from http://authoritynutrition/10-leading-causes-of-weight-gain-and-obesity.

Bhurosy, T., and Jeewon, R. (2014). Overweight and obesity epidemic in developing countries: a problem with diet, physical activity, or socioeconomic status? *Scientific World Journal* 2014:964236. doi: 10.1155/2014/964236. Epub 2014 Oct 14.

Chowdhury, M.A.B., Adnan, M.M., Hassan, M.Z. (2018). Trends, prevalence and risk factors of overweight and obesity among women of reproductive age in Bangladesh: a pooled analysis of five national cross-sectional surveys. *BMJ Open* 2018;8:e018468. doi:10.1136/bmjopen-2017-018468.

Gambia Bureau of Statics (GBoS), 2016.

Kanter, R. and Caballero, B. (2012). *Global gender disparities in obesity: a review.* Adv Nutr 2012 Jul 1;3(4):491-8. doi: 10.3945/an.112.002063. PMID: 22797984 PMCID: PMC3649717 DOI: 10.3945/an.112.002063.

Knoema.com (2017). Gambia Female Obesity Prevalence, 1960-2017. Retrieved on 21 August 2018 from https://knoema.com>...>health

Kulie, T., Slattengren A., Redmer, J., Counts, H., Eglash, A., Schrager, S. (2011). Obesity and Women's Health: An Evidence-Based Review. *Journal of the American Board of Family Medicine.*

Mangemba, N.T., San Sebastian, M. 2020. Societal risk factors for overweight and obesity in women in Zimbabwe: a cross-sectional study. *BMC*

Public Health 20, 103. https://doi.org/10.1186/s12889 -020-8215-x

Mbochi, R.W. (2010). Overweight and Obesity Prevalence and Associated Socioeconomic Factors, Physical Activity and Dietary Intake among Women in Kibera Division, Nairobi. Department of Foods, Nutrition and Dietetics. Retrieved on 23 July 2014 from . http://www.ir-library.ku.ac.ke >mbochi,+regina.

The National Institute of Diabetes and Digestive and Kidney Diseases (2015). *Health Risk of Being Overweight.* Retrieved from https://www.niddk.nih.gov.

Nguyen, D.M., El-Serag, H.B. (2010). The epidemiology of obesity. Gastroenterol Clin North Am. Mar; 39(1):1-7. doi:10.1016/j.gtc.2009.12.014. PMID: 20202574 .

Neupane, S., K.C., P. & Doku, D.T. Overweight and obesity among women: analysis of demographic and health survey data from 32 Sub-Saharan African Countries. *BMC Public Health* 16, 30 (2015). Retrieved from https://doi.org/10.1186 /s12889-016-2698-5.

Song N, Liu F, Han M*, et al.* (2019). Prevalence of overweight and obesity and associated risk factors among adult residents of northwest China: a cross-sectional study *BMJ Open* 2019;9:e028131. doi: 10.1136/bmjopen-2018-028131

World Health Organization, Global Physical Activity Questionnaire (GPAQ). Retrieved from www.who.int /chp/steps

World Health Organization Media Centre, (2013). *Obesity and Overweight*, Geneva, Switzerland.

World Health Organization, Global Health Observatory Data (2016). *Obesity and Overweight.*

World Health Organization, Global Health Observatory Data. (2013). *Overweight and Obesity.* Retrieved from: www.who.int>gho

World Health Organization (2020). *Obesity and Overweight.* Fact Sheet.