OBESITY IN ADULT RESIDENTS OF ACCRA, GHANA

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Objectives: To determine the prevalence of obesity in Ghanaian adults.

Design: 6300 adults, aged 25 years and older, were selected by random cluster sampling using electoral enumeration areas and listings of adults.

Setting: Two urban and one rural community in the Greater Accra region of Ghana.

Subjects and Methods: 4733 (males=1860, females=2873) adult Ghanaians participated. Height and weight were determined for subjects wearing light clothing and without shoes.

Results: The mean age and BMI were 44.3 years and 24.4 kg/m^2, respectively. Women, though younger, had higher BMI values compared to males (25.6 vs 22.6 kg/m^2, respectively; $P<.001$). The overall crude prevalence of overweight (25.0–29.9 kg/m^2) and obesity (≥30 kg/m^2) were 23.4% and 14.1% for females and males, respectively. The rates of overweight (27.1% vs 17.5%) and obesity (20.2% vs 4.6%) were both higher in women than men. The age-standardized prevalence of obesity in Ghanaians was 13.6%. Obesity increased with age, peaking in the 55–64-year age group. The first to fourth BMI quartiles were: ≤20.6, 20.7–23.3, 23.4–27.2, and ≥27.3 kg/m^2, respectively. At all ages, more females (32.9%) than males (12%) were placed within the 4th BMI quartile. Residents from the high-class residential area had higher BMI, compared to subjects from the lower class suburb. Also, urban residents had higher BMI compared to rural subjects.

Conclusion: Overweight and obesity are common in Ghanaians, particularly among females, the elderly, and urban dwellers. Further work is needed to ascertain the determinants of overweight and obesity in Ghanaians. (*Ethn Dis.* 2003;13[suppl2]:S2-97–S2-101)

Key Words: Obesity, Overweight, Prevalence, Survey, Population, Ghana, Sub-Saharan Africa, Urban, Rural, Social Class

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INTRODUCTION

The prevalence rates of overweight and obesity appear to be increasing rapidly in many countries, and reflect a general, overall increase in body weight.[1–4] Excess body weight is associated with increased risk for cardiovascular and other chronic disorders,[5] type 2 diabetes,[6] dyslipidemia,[5,6] endocrine disorders,[7] stroke, osteoarthritis, some cancers, and gallbladder disease.[8–10] An increase in the prevalence of obesity within a population is often seen prior to a rise in the occurrence of chronic non-communicable diseases, such as hypertension and diabetes.[11]

Obesity and overweight appear to be increasing in developing countries, as these nations undergo acculturation, with alterations in diet and activity patterns resulting from Westernization.[3,12] Currently, however, little data exist on obesity among Africans. In fact, in 2 recent reviews on obesity, no reference was made to Africa. To date, a population-based study of the prevalence of obesity has never been performed in Ghanaian adults. In recent years, several investigators have published BMI percentile data for other countries[13–16]; no such data have been compiled in Ghanaians. The most commonly employed measure of obesity in epidemiological research is the Quetelet index or body mass index (BMI).[17] The subject of this report is the prevalence and the descriptive analysis of overweight and obesity, as assessed by BMI, in adult Ghanaians. Also presented are percentile data and BMI quartiles that may be used as reference data to interpret BMI in accordance with sex and gender in adult Ghanaians. In addition to providing baseline data for future monitoring of trends in body weight in Ghanaians, such information may assist health planners in formulating policy to combat overweight and obesity in Ghanaians.

STUDY PARTICIPANTS AND METHODS

The study sample was deliberately selected from a rural community and two urban areas in the Greater Accra region of Ghana, to allow for a comprehensive non-communicable disease survey. A stratified 2-stage cluster sampling technique was used. The first stage units were composed of census enumeration areas in the 3 survey areas. The second stage units were represented by the adults, aged 25 years and older.

Sampling Frame and Sample Allocation

The Ghana Statistical Service randomly selected 14 census enumeration areas from each of the 3 survey areas. Each enumeration area was expected to include approximately 200 adults, aged 25 years and older, whose names were then segregated onto a list of eligible adults. One hundred fifty adults were subsequently selected per enumeration area to participate in the study by systematic random sampling from the listed eligible adults per enumeration area. A total of 6300 subjects (2100 per survey area) were thus recruited into the study.

Survey Methods

Subjects were requested to report to a central survey site (2 sites in the rural area) early in the morning, after an overnight fast. Anthropometric measurements were performed on subjects wearing light clothing and without shoes.

To date, a population-based study of the prevalence of obesity has never been performed in Ghanaian adults.

Weight was measured with a heavy-duty Seca 770 floor digital scale (Seca, Hamburg, Germany) to the nearest 0.1 kg. Height was measured with a stadiometer to the nearest 0.1 cm. Body mass index (BMI) was calculated from the weight and height measurements.

Data Analysis

Relative weight (BMI) was categorized as follows: underweight=<18.5 kg/m^2; normal=≥18.5–24.9 kg/m^2; overweight=≥25–30 kg/m^2; and obesity=>30 kg/m^2.[18] Prevalence estimates of overweight and obesity were age-standardized to the total Ghanaian population by the direct method,[19] using a population estimate of 18.3 million and from adults, aged 25 years and older.[20]

The statistical package SPSS 10.0 for Windows (SPSS Inc, Chicago, Ill) was used for analyses. The results for continuous variables are expressed as means with 95% confidence intervals, unless otherwise stated.

Ethics

The study was approved by the Ethical Review Committee of the University of Ghana Medical School, and complied with the Helsinki Declaration of 1975 (revised in 1983) on human experimentation.

RESULTS

A total of 4733 (males=1860, females=2873) adult Ghanaians, aged 25 years and older, participated in the study, representing a response rate of 75% of the eligible group. This study found the crude prevalence of obesity in Ghanaian adults to be 14.1%, and the age-standardized prevalence of obesity was reported as 13.6%. Table 1 shows the comparison of the means with 95% confidence intervals (CI) of selected variables, and the prevalence of overweight and obesity in males and females, and in the total study population. Although younger, the females had higher BMI values, with the rates of overweight and obesity being significantly higher in females, compared to males.

Table 2 shows the sex- and age-specific means (with confidence intervals), and distribution of BMI categories. No clear increase in mean BMI with age was observed in males; however, mean BMI in females rose steadily to peak in the 55- to 64-year-age group. The highest prevalence of overweight and obesity in males occurred in the 45- to 64-year-age range. In females, the 35- to 44-year and 55- to 64-year-age categories had the highest rates of overweight and obesity, respectively. The sex- and age-specific distribution of BMI quartiles is shown in Table 3. At all ages, more females than males were placed within the 4th BMI quartile.

Table 4 shows the percentiles of BMI by sex and age category. Table 5 contrasts the mean age and BMI in the

Table 1. Comparison of the means (95% confidence intervals, CI) of selected variables and the prevalence of overweight and obesity in males and females

Variable	Male Mean (95% CI) *N*=1860	Female Mean (95% CI) *N*=2873	Total Population (95% CI) *N*=4733
Age	44.9 (44.2–45.6)	44.0 (43.4–44.5)	44.3 (43.9–44.8)
Height (m)	1.71 (1.70–1.71)	1.60 (1.59–1.60)	1.64 (1.64–1.64)
Weight (kg)	65.8 (65.2–66.4)	64.9 (64.3–65.4)	65.2 (64.8–65.7)
BMI kg/m^2	22.6 (22.4–22.8)	25.6 (25.4–25.8)	24.4 (24.3–24.6)
% Overweight	17.5	27.1	23.4
% Obesity	4.6	20.2	14.1

Table 2. Distribution of body mass index by BMI categories by age and sex

Sex and Age Group	*N*	Mean BMI (kg/m^2) (with CI)	Distribution of Body Mass Index % of Subjects			
			<18.4	18.5–24.9	25.0-29.9	≥30
Men (years)						
25–34	555	22.0 (21.8–22.3)	5.4	88.8	8.8	2.0
35–44	444	23.0 (22.7–23.4)	5.0	69.9	20.7	4.7
45–54	391	23.3 (22.8–23.7)	9.0	59.9	25.8	6.1
55–64	247	22.5 (21.9–23.1)	15.9	60.2	16.3	7.7
≥65	222	22.0 (21.4–22.6)	22.1	54.1	19.4	4.5
All men	1859	22.6 (22.4–22.8)	9.4	68.5	17.5	4.6
Women (years)						
25–34	900	23.9 (23.6–24.2)	7.7	58.6	22.6	11.1
35–44	764	26.2 (25.8–26.6)	4.6	42.0	31.4	22.0
45–54	561	26.7 (26.2–27.2)	5.0	41.7	27.3	26.0
55–64	319	27.2 (26.5–27.9)	6.3	34.5	26.3	32.9
≥65	331	25.3 (24.7–26.0)	10.6	40.5	30.2	18.7
All women	2875	25.6 (25.4–25.8)	6.5	46.1	27.1	20.2
Total	4734	24.4 (24.3–24.6)	7.7	54.9	23.4	14.1

Table 3. Sex- and age-specific distribution of BMI quartiles

Age Group	Distribution of Body Mass Index by Quartiles % of Subjects			
	1st Quartile (≤20.6)	2nd Quartile (20.7–23.3)	3rd Quartile (23.4–27.2)	4th Quartile (≥27.3)
Males				
25–34	33.0	43.4	17.8	5.8
35–44	28.2	35.1	23.9	12.8
45–54	31.5	26.9	23.3	18.4
55–64	45.9	19.9	18.7	15.4
≥65	41.4	24.8	23.0	10.8
All men	34.2	32.6	21.2	12.0
Women				
25–34	25.1	27.6	26.9	20.4
35–44	14.5	19.2	29.1	37.2
45–54	15.7	16.8	28.3	39.2
55–64	18.5	15.0	18.5	48.0
≥65	24.2	16.6	27.2	32.0
All women	19.6	20.6	26.9	32.9

This study found the crude prevalence of obesity in Ghanaian adults to be 14.1%, and the age-standardized prevalence of obesity was reported as 13.6%.

3 survey areas, urban high/middle class (Labone/Cantoments), urban lower class (Teshie), and rural (Abokobi/Danfa) suburbs of Greater Accra. Among urban dwellers, subjects from the high/middle class area were younger, but exhibited higher BMI values, compared to subjects from the lower class suburb. Subjects from the rural area had lower mean BMI values, compared to urban subjects.

DISCUSSION

The World Health Organization has recently highlighted the global epidemic of obesity.[3] Little data on obesity exist on sub-Saharan populations in Africa.[21] This is the first population-based cross-sectional study to provide data on the prevalence of overweight and obesity in Ghanaian adults.

The mean BMI of Ghanaian males (22.6 kg/m^2) was comparable to that of other Black males in Nigeria (21.7 kg/m^2–22.5 kg/m^2),[22,23] and Jamaica (23.6 kg/m^2; 23.8 kg/m^2),[22,23] but was lower than that of US Black males (27.0 kg/m^2; 26.5 kg/m^2).[22,23] It is interesting to note that the relative fatness of Ghanaian males was comparable to that of Yemeni males (22.5 kg/m^2).[24] In contrast, the Ghanaian females (25.8 kg/m^2) were more obese than their Black counterparts in Nigeria (22.9 kg/m^2),[22,23] but less obese than Black females in Jamaica (27.0; 28.0 kg/m^2),[22,23] in UK (29.0 kg/m^2),[25] and in the United States (30.9; 29.4 kg/m^2).[22,23] West Africans share ethnogenetic links with Blacks in the Caribbean and the United States.[26] Therefore, it is conceivable that the relatively high rates of obesity in Black Americans may occur in Ghanaians with the increasing urbanization experienced during cultural transition.

A notable finding in the present study is the relatively high prevalence of overweight (23.4%) and obesity (14.1%) in Ghanaians; clearly, obesity is not rare in Ghanaian adults. It must be noted that lower rates have been reported in some industrialized countries.[16,21,27]

The proportion of underweight Ghanaian males (9.4%) was considerably higher than that reported for Black males in the United States (1.98%). Fewer Ghanaian females were underweight, compared to the males. From the present study, the percentage of overweight or obese women was more than twice that of men (47.3% vs 21.1%, respectively). In both sexes, urban subjects, and subjects from the higher social class suburb, were more likely to be overweight, compared to

Table 4. Percentiles of body mass index by age category and sex

Age Group (*N*)	Percentiles of Body Mass Index (kg/m^2)						
	5	10	25	50	75	90	95
Men							
25–34 (555)	18.3	19.0	20.2	21.6	23.2	25.2	27.6
35–44 (444)	18.4	19.1	20.4	22.1	25.1	28.1	29.9
45–54 (391)	17.7	18.6	20.1	22.5	26.0	29.0	30.7
55–64 (246)	16.7	17.9	19.3	21.2	24.9	29.1	31.5
65–74 (141)	16.4	17.3	19.2	21.3	24.9	28.0	29.9
≥75+ (81)	16.3	16.9	18.3	21.3	25.0	27.9	29.6
Women							
25–34 (900)	17.8	18.9	20.6	23.1	26.2	30.4	32.6
35–44 (764)	18.5	19.9	22.2	25.5	29.2	34.1	37.5
45–54 (561)	18.4	19.6	22.3	25.6	30.1	35.7	38.5
55–64 (319)	18.2	19.4	21.6	26.9	31.3	36.0	38.2
65–74 (219)	17.3	19.0	21.8	26.0	29.3	35.1	38.3
≥75 (112)	15.8	17.0	19.4	22.7	26.2	30.3	34.5

Table 5. Sex-specific distribution of BMI categories by survey area

Sex and area	Mean age (CI) yr	Mean BMI (CI) kg/m^2
Men		
Labone/Cantoments	42.83	24.0
(*N*=664)	(41.8–43.9)	(23.7–24.3)
Teshie	45.0	22.5
(*N*=558)	(43.8–46.2)	(22.2–22.9)
Abokobi/Danfa	46.9	21.2
(*N*=639)	(45.8–48.1)	(20.9–21.4)
Women		
Labone/Cantoments	41.6	27.0
(*N*=816)	(40.7–42.6)	(26.5–27.4)
Teshie	45.3	25.5
(*N*=1071)	(44.4–46.2)	(25.2–25.9)
Abokobi/Danfa	44.5	24.5
(*N*=988)	(43.5–45.4)	(24.2–24.9)

their rural and lower income counterparts.

The first to fourth BMI quartiles were: ≤20.6, 20.7–23.3, 23.4–27.2, and ≥27.3 kg/m^2, respectively. At all ages, more females (32.9%) than males (12%) were placed within the 4th BMI quartile. In recent years, several investigators have published percentile data for other countries.[13–16] No such data previously existed for Ghanaians. For the first time, we present population-based percentile data that could be used as reference data to interpret BMI in accordance with sex and gender in adult Ghanaians. Further, current anthropometric data rarely include people older than 74 years, and few normative data exist for the elderly in developing countries.[28] Our subjects included 82 men and 112 women, aged 75 years or older, so also provide reference data, though limited, for use in elderly Ghanaian subjects.

In conclusion, overweight and obesity are common in Ghanaians, particularly among females, the elderly, and urban dwellers. Further work is needed, however, to ascertain the determinants of obesity in Ghanaians.

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