OVERWEIGHT AND OBESITY IN BLACK WOMEN: A REVIEW OF PUBLISHED DATA FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Richard F. Gillum, MD
Hyattsville, Maryland

Overweight is a major health problem for black women in the United States. The age-adjusted prevalence of overweight was 47.1 percent in 1960–1962, 46.8 percent in 1971–1974, and 48.1 percent in 1976–1980 for black women aged 25 to 74 years, much higher than that of white women or men of either race. Black women born in later decades tended to be more overweight than those born earlier. Black women were first clearly more obese than white women in the third decade of life. Overweight was inversely related to family income and education. Rural and southern women were more overweight than their urban, northern, and western counterparts. More research is needed upon which to base efforts to control and prevent overweight in black women.

Overweight is a major health problem for black women. Among adults the prevalence of overweight in black women is greater than among white women or among men of either race.[1] Black women suffer more from overweight-associated conditions resulting in significantly higher rates of morbidity and mortality than do white women.[1–6] Mortality rates from coronary heart disease, stroke, hypertensive disease, and diabetes are substantially higher among black women than among white women. This article will review published data from the National Center for Health Statistics* on the following aspects of the problem: (1) trends and cohort effects for overweight among black women, (2) the age of onset of greater overweight and obesity of black as compared with white women, and (3) correlates of greater overweight in black women.

Most of the data discussed in this article are derived from five nationwide examination surveys of representative samples of the US population: (1) the Health Examination Survey, Cycle I (HES I), of 6,672 adults

From the National Center for Health Statistics, Office of Analysis and Epidemiology Program, Hyattsville, Maryland. Requests for reprints should be addressed to Dr. Richard F. Gillum, Office of Analysis and Epidemiology Program, National Center for Health Statistics, 3700 East West Highway, Hyattsville, MD 20782.

* Most National Center for Health Statistics publications are available in libraries. They can be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC. 20402, (202) 783-3238. Computerized searches of these publications from 1971 to the present can be ordered from commercial information retrieval services such as DIALOG, using the GPO Monthly Catalog, GPO Publications Reference File, or the American Statistics Index databases. A catalog of currently available publications can be ordered from the Scientific and Technical Information Branch, DDS, National Center for Health Statistics, 3700 East West Highway, Hyattsville, Maryland 20782, (301) 436-8500.

aged 18 to 79 years, conducted in 1959 to 1962[7]; (2) the National Health and Examination Survey, Cycle II (HES II), of 7,119 children aged 6 to 11 years who were examined between 1963 and 1965[8]; (3) the National Health Examination Survey, Cycle III (HES III), with data for 6,768 youths aged 12 to 17 years who were examined between 1966 and 1970[9]; (4) the first National Health and Nutrition Examination Survey (NHANES I), with data for 20,749 persons aged 1 to 74 years who were examined between 1971 and 1975[10]; and (5) the second National Health and Nutrition Examination Survey (NHANES II), with data for 20,322 persons aged 1 to 74 years who were examined between 1976 and 1980.[11] In these surveys, the participants underwent detailed interviews and examinations including anthropometric measurements. Also cited are results from the annual cycles of the Health Interview Survey,[12] which in certain years obtained data on self-reported height and weight and on perceptions and behaviors related to overweight.

In Table 1 the prevalence of overweight among persons aged 25 to 74 years is displayed according to race, sex, and age in the United States at three periods, 1960–1962, 1971–1974, 1976–1980.[13] Overweight is defined for men as body mass index greater than or equal to 28 kilograms per meter squared, and for women, as body mass index greater than or equal to 35 kilograms per meter to the 1.5 power. These cut points were used because they represent the sex-specific 85th percentiles for persons aged 20 to 29 years in the 1976–1980 National Health and Nutrition Examination Survey. These criteria for overweight are arbitrary but nonetheless useful for examining trends and racial differences. The prevalence of overweight was substantially greater in black than in white women at each of the three periods. Translated into more familiar units, in 1971–1974 the mean heights of black and white women were identical at 63.7 inches with a standard deviation of 2.5 inches for both groups.[14] The mean weight of black women, however, was 156 pounds with a standard deviation of 41 pounds, fully 14 pounds greater than that for white women, 142 (SD 31 pounds). Fully 50 percent of black women weighed more than 148 pounds, 25 percent weighed more than 176 pounds, 10 percent weighed more than 207 pounds, and 5 percent weighed more than 228 pounds. Only 5 percent of white women weighed 200 pounds or more. Overall, black women were more overweight in 1976 to 1980 than they were at either of the earlier periods (Table 1). The sex difference in overweight is much greater for blacks than for whites as measured by body mass index.

Have black women been more overweight than white women throughout the 20th century in the United States? National data are not available to answer this question. However, plotting the data from Table 1 by age cohorts may suggest whether women growing up in earlier as compared with later decades in the first half of the 20th century tended to be more or less obese as adults. For black women (Figure 1), there is a suggestion that women born in later decades, for example 1927 to 1936, tended to be more overweight at a given age than women born 1917 to 1926, who in turn were more overweight at a given age than women born 1907 to 1916. With only three survey points in such a small number of birth cohorts (with overlapping measurements at a given age), these results are inconclusive. A similar plot of prevalence of overweight by birth cohort among white women showed no consistent cohort pattern whatever (Figure 2).

At what age were black women first more overweight or obese than white women? No systematic differences in overweight appeared in the national data between black and white women before the third decade of life.[14–17] In NHES II and NHES III black girls under the age of 12 had lower weight for height than white girls.[15–17] The ponderal index (height divided by the cube root of weight) gradually changed through adolescence from the childhood pattern of greater ponderosity among white children to the adult pattern of greater ponderosity among black women in the 1960s (Figure 3). Using body mass index (weight divided by the square of height), such a gradual trend was not apparent (not shown). A detailed published analysis was not found of overweight in black and white adolescents in later surveys. Thus, it is not clear from published national data whether the greater overweight in black women develops only in adulthood or is a gradual process beginning in adolescence. Further study on this point is needed.

Overweight is defined as excessive weight for a given height and stature. Obesity is defined as an excessive amount of adipose tissue in the body. Skinfold thickness is a commonly used survey method for estimating the amount of body fat tissue. The median subscapular skinfold for persons aged 1 to 74 years by age, race, and sex in the United States 1971–1974 is depicted in Figure 4.[18] As in the NHES surveys of the 1960s, [19,20] there was no consistent racial difference

TABLE 1. OVERWEIGHT PERSONS AGED 25 TO 74 YEARS, BY RACE, SEX, AND AGE: UNITED STATES, 1960–1962, 1971–1974, AND 1976–1980*

Sex and Age	Race and Period								
	Total**			White			Black		
	1960–1962	1971–1974	1976–1980	1960–1962	1971–1974	1976–1980	1960–1962	1971–1974	1976–1980
	Percent of population								
Both sexes									
All ages, 25–74 years***	25.4	26.7	27.0	24.2	25.7	25.9	35.1	38.0	40.0
25–34	17.7	19.9	19.3	16.4	19.1	18.8	29.8	28.4	24.3
35–44	22.6	27.3	27.0	20.6	25.6	25.5	37.5	44.3	40.4
45–54	27.9	29.2	30.6	26.8	28.1	29.1	34.8	39.6	51.2
55–64	32.3	30.4	31.1	31.4	29.5	29.9	43.2	41.4	44.3
65–74	30.7	29.2	29.3	30.9	28.5	28.4	29.4	37.0	42.7
Male									
All ages, 25–74 years***	23.1	24.8	25.3	23.3	24.8	25.2	22.5	27.0	30.0
25–34	20.6	21.6	19.0	20.1	21.6	19.6	31.7	24.6	16.6
35–44	21.8	28.2	27.3	20.9	27.6	26.5	28.0	38.9	39.0
45–54	26.8	27.0	29.7	27.7	27.6	29.1	18.5	22.0	41.4
55–64	25.0	23.8	26.6	26.5	23.8	26.9	15.8	25.6	25.5
65–74	20.6	22.0	23.7	21.3	22.1	24.3	*11.7	21.1	25.1
Female									
All ages, 25–74 years***	27.4	28.4	28.6	24.9	26.4	26.3	47.1	46.8	48.1
25–34	15.1	18.4	19.6	13.0	16.9	18.1	28.5	31.2	30.4
35–44	23.4	26.4	26.8	20.3	23.7	24.5	45.6	48.5	41.6
45–54	29.0	31.2	31.5	25.9	28.7	29.1	50.9	54.2	59.6
55–64	39.1	36.3	35.9	35.8	34.6	32.6	71.0	54.3	60.0
65–74	38.7	34.8	33.5	38.6	33.5	31.5	*43.8	49.2	56.0

* From the National Center for Health Statistics.[11,13] Data are based on physical examinations of a sample of the civilian noninstitutionalized population.

** Includes all other races not shown separately.

*** Age adjusted by the direct method to the 1970 civilian noninstitutionalized population aged 25 to 74 years, using 5 age groups.

Note: Overweight is defined for men as body mass index greater than or equal to 28 kilograms/meter^2, and for women as body mass index greater than or equal to 35 kilograms/meter$^{1.5}$. These cut points were used because they represent the sex-specific 85th percentiles for persons aged 20 to 29 years in the 1976–1980 National Health and Nutrition Examination Survey.

in subscapular skinfold thickness among children or youths. Beginning in the third decade and throughout the remaining age groups, however, black women had markedly thicker subscapular skinfolds than white women. Triceps skinfolds show a marked racial difference in both sexes in childhood with whites having much thicker skinfolds than blacks.[18–20] This suggests a racial difference in the limb vs trunk distribution of fat, making triceps skinfolds less useful for comparing obesity between blacks and whites. Nonetheless, even the triceps skinfold thickness becomes greater among black women than white women in adulthood.[18] These findings are consistent with those of the Ten-State Nutrition Survey of 1968–1970,[21] a

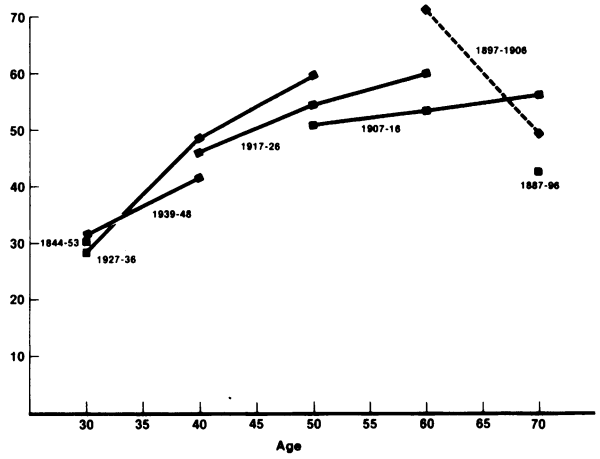

Figure 1. Prevalence of overweight by age and birth cohort in black women in three national health examination surveys, United States. From the National Center for Health Statistics[13]

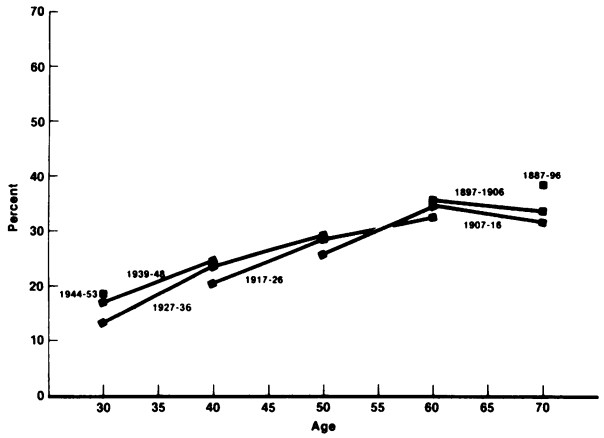

Figure 2. Prevalence of overweight by age and birth cohort in white women in three national health examination surveys, United States. From the National Center for Health Statistics[13]

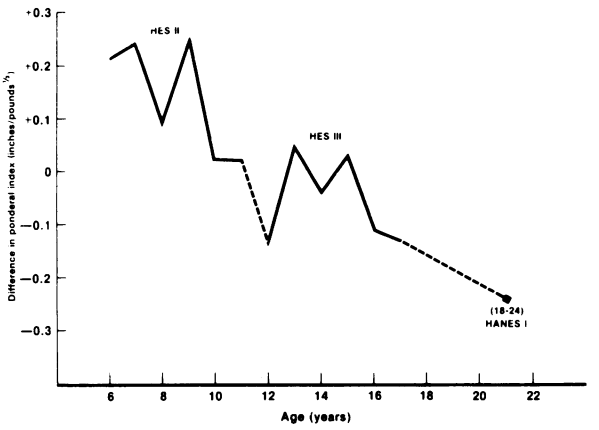

Figure 3. Black-white difference in ponderal index by age in women aged 6 to 24 years. From the National Center of Health Statistics[14–17]

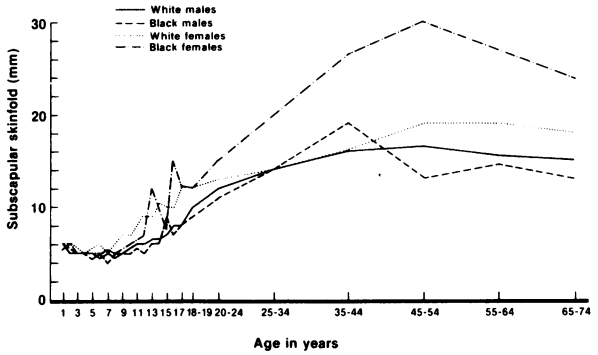

Figure 4. Median subscapular skinfold for persons age 1 to 74 years, by age, race, and sex: United States, 1971–1974. From the National Center for Health Statistics[18]

lower income sample than NHANES (which included more than 40,000 persons, nearly half of them black). Thus greater obesity in black women is first clearly evident in the third decade of life.

What are some of the correlates of overweight in black women? In NHANES I, overweight was inversely related to family income and educational attainment in black and white women with the relationship to education in black women having the strongest correlation (Table 2).[22] Black women in rural areas were more overweight than those in urban areas. Black women living in the southern region were more overweight than those living in other regions. These differences were similar but larger among black than white women. Differences in height and weight between black and white women in various strata of these variables are shown in Table 3. Multivariate analysis of data from NHANES II also showed an independent effect of black race on overweight in women.[23] Overweight black women had an excess prevalence of definite hypertension of 50 percent and of elevated cholesterol of 20 percent in NHANES II.[23] Among children in HES II (1963–1965), lower income or education was associated with lower weight.[24] Future analyses will show if this was true in the 1970s.

Data from the 1974 Health Interview Survey indicate that fewer black women perceived themselves

TABLE 2. DIFFERENCES IN AGE-ADJUSTED MEAN HEIGHT AND MEAN WEIGHT OF ADULTS AGED 18 TO 74 YEARS BETWEEN THE LOWEST AND HIGHEST ANNUAL FAMILY INCOME AND EDUCATIONAL LEVEL, BY RACE AND SEX: UNITED STATES, 1971–1974*

Race, Sex, and Age	Mean Height		Mean Weight	
	Differences in Inches		Differences in Pounds	
	Annual Family Income	Educational Level	Annual Family Income	Educational Level
Age-adjusted values				
Men, 18–74 years	0.7	1.7	12	9
Women, 18–74 years	0.4	1.5	−11	−10
White men, 18–74 years	0.6	1.8	13	9
White women, 18–74 years	0.4	1.7	−8	−8
Black men, 18–74 years	0.4	1.3	10	18
Black women, 18–74 years	0.4	0.8	−5	−13

* From the National Center for Health Statistics[22]

TABLE 3. WHITE-BLACK DIFFERENCES IN AGE-ADJUSTED MEAN HEIGHT AND MEAN WEIGHT OF ADULTS AGED 18–74 YEARS, BY SEX AND SELECTED SOCIOECONOMIC AND GEOGRAPHIC VARIABLES: UNITED STATES, 1971–1974*

Selected Socioeconomic and Geographic Variables	Mean Height		Mean Weight	
	Differences in Inches		Differences in Pounds	
	Men	Women	Men	Women
Annual family income				
Under $4,000	0.5	−0.3	−4	−13
$4,000–$6,999	−0.1	−0.1	2	−12
$7,000–$9,999	—	—	−3	−11
$10,000–14,999	0.3	−0.2	5	−12
$15,000 and over	0.7	−0.3	−2	−16
Educational level				
Less than 9 years	—	−0.8	3	−14
9–11 years	−0.5	−0.3	—	−16
12 years	0.5	0.3	4	−11
13 years or more	0.5	0.1	−7	−9
Urbanization status				
Urbanized area	0.3	—	2	−13
Urban area	0.9	−0.2	5	−23
Rural area	0.5	—	1	−15
Geographic region				
Northeast	−0.2	—	−5	−12
Midwest	0.9	0.3	2	−8
South	0.8	0.1	2	−19
West	−0.1	−0.4	−4	−13

* From the National Center for Health Statistics[22]
Note: Negative signs indicate higher mean values for black persons than for white persons.

to be overweight than white women (46 vs 51 percent), despite the excess prevalence of overweight in blacks.[25] Of those who perceived themselves overweight, 75 percent of blacks and 67 percent of white women said they were trying to lose weight. This indicates that cultural norms for desirable weight may vary by race.

The nutrition component of NHANES I indicated that black women reported they consumed slightly fewer calories on average than white women.[26] Mean calorie intake for black women was 1,614, white women, 1,629. The difference persisted when calories were expressed as calories per kilogram of body weight. If these dietary data are accurate, a lesser expenditure of calories among black women is suggested. Unfortunately, national data on occupational and nonoccupational physical activity levels among black as compared with white women were lacking in the literature. Other possible explanations of the paradox that obese groups of both races report intake of fewer calories in surveys are systematic underreporting of caloric intake by obese persons, underestimation of caloric content of foods obese persons prefer, and more efficient extraction of calories from food by the obese.[27]

What are the most appropriate criteria for determining overweight or obesity in blacks? Although a few prospective studies clearly link overweight to mortality and morbidity among blacks,[1] data are insufficient for determining an optimal weight for height. Indices used in the publications of the National Center for Health Statistics include relative desirable weight (weight expressed as a percentage of a selected weight percentile from the general population), weight divided by height, body mass index, and ponderal index.[28] Also suggested was the solution for p of the formula weight (w) divided by height (h) to the p power (w/h^p) for the development of an index specific to a particular group. Such results have not appeared for blacks. For determining obesity, measuring subscapular skinfold thickness seems superior to triceps for blacks as discussed above. Further, recent reports suggest that the distribution of adipose tissue may relate to the risk of cardiovascular disease and diabetes. Specifically, the ratio of waist-to-hip circumference has been prospectively related to disease risk among white women.[29] Other reports indicate that fat on the trunk may be more closely related to hypertension or blood pressure than fat on the limbs.[30,31]

Although coronary heart disease, stroke, and hypertensive mortality rates have declined substantially for black as well as white women in recent years, rates for black women remain substantially higher than those for white women.[1] How much of the differentials in mortality among black vs white women could be eliminated if obesity in black women were controlled? Data are lacking to answer this question. Some computations, however indicate that a substantial fraction of hypertension incidence could be prevented by the control and prevention of obesity among black women.[1]

Clearly, efforts of personal physicians and public health agencies aimed at reducing calorie intake and increasing physical activity levels among obese black women are useful.[32] More research, however, is needed into the determinants of obesity among black women to optimally design such programs. Further data are needed on the relative contributions of physical inactivity vs excessive calorie intake in the origin and maintenance of obesity in black women. Furthermore, research is needed to determine the age of onset of obesity more accurately. Because long-term reversal of obesity once established is so difficult, prevention of obesity is very important. If physical inactivity is a major factor, school and college physical education and extracurricular sports for girls and young women might be a logical intervention. The effects of programs such as competitive rope jumping ("double dutch") in New York City on the development of obesity in black adolescent girls might be evaluated. Maternal and child health programs have also been suggested as settings for intervention.[33] The independence and mechanism of the association of race, sex, low income, and educational level with obesity should be elucidated. As the prevalence of obesity among black women resembles that among native Americans and, to a lesser extent, Hispanic-Americans, searches for common determinants and mechanisms might prove fruitful.[34] International studies of obesity in black women in countries at various stages of industrialization as well as migrant studies might also shed light on the problem. Also needed is more knowledge about cultural norms, attitudes, beliefs, and self-perceptions of overweight in black women of various backgrounds. The relationship of parity to overweight in black women also deserves study.[35] As indicated above, further studies of racial patterns of adipose tissue distribution and their possible relationship to cardiovascular and diabetes mortality and morbidity among black women are needed. Despite the lack of some types of information, data from the surveys of the National Center for

Health Statistics are one of the most valuable resources for clinicians, educators, and researchers interested in overweight, obesity, and the health of black persons.[36]

Literature Cited

1. Gillum RF, Grant CT. Coronary heart disease in black populations. II. Risk factors. Am Heart J 1982; 104:852–864.
2. Barrett-Connor E, Lomgard D. Sex differences in diabetes mellitus. In: Gold EB, ed. The Changing Risk of Disease in Women. New York: DC Heath, 1984.
3. Gillum RF. Coronary heart disease in black populations. I. Mortality and morbidity. Am Heart J 1982; 104:839–851.
4. Wing S, Manton KG. The contribution of hypertension to mortality in the U.S., 1968–1977. Am J Public Health 1983; 73: 140–144.
5. Gross CR, Kace CS, Mohr JP, et al. Stroke in south Alabama: Incidence and diagnostic features—A population based study. Stroke 1984; 15:249–255.
6. Bonham GS, Brock DB. The relationship of diabetes with race, sex and obesity. Am J Clin Nutr 1985; 41:776–783.
7. National Center for Health Statistics. Cycle I of the Health Examination Survey: Sample and response, United States, 1960–1962. Vital and Health Statistics, Series 11 No. 1. DHEW publication No. (PHS) 1000. Government Printing Office, 1964.
8. National Center for Health Statistics. Plan, operation and response of a program of children's examinations. Vital and Health Statistics, Series 1 No. 5. DHEW publication No. (PHS) 1000. Government Printing Office, 1967.
9. National Center for Health Statistics. Plan and operation of a health examination survey of U.S. youths 12–17 years of age. Vital and Health Statistics Series 1, No. 8. DHEW publication No. (PHS) 1000. Government Printing Office, 1969.
10. National Center for Health Statistics. Plan and operation of the Health and Nutrition Examination Survey, United States, 1971–1973. Vital and Health Statistics, Series 1 No. 10a and b. DHEW publication No. (PHS) 79-1310. Government Printing Office, 1973.
11. National Center for Health Statistics. Plan and operation of the Second National Health and Nutrition Examination Survey, 1976–80. Vital and Health Statistics, Series 1 No. 15. DHHS publication No. (PHS) 81-1317. Government Printing Office, 1981.
12. National Center for Health Statistics. Health Interview Survey Procedure, 1957–1974. Vital and Health Statistics, Series 1, No. 11. DHEW publication No. (HRA) 75-1311. Government Printing Office, 1975.
13. National Center for Health Statistics. Health, United States, 1984. DHHS publication No. (PHS) 85-1232. Government Printing Office, 1985.
14. National Center for Health Statistics. Weight and height of adults 18–74 years of age. Vital and Health Statistics, Series 11, No. 211. DHEW publication No. (PHS) 79-1659. Government Printing Office, 1979.
15. National Center for Health Statistics. Height and weight of children 6–11 years by age, sex, race and geographic region, United States. Vital and Health Statistics, Series 11, No. 104. DHEW publication No. (PHS) 1000. Government Printing Office, 1970.
16. National Center for Health Statistics. Body dimensions and proportions, white and negro children 6–11 years, United States. Vital and Health Statistics, Series 11, No. 143. DHEW publication No. (PHS) 1000. Government Printing Office, 1974.
17. National Center for Health Statistics. Body weight, stature and sitting height: White and negro youths 12–17 years, United States. Vital and Health Statistics, Series 11, No. 26. DHEW publication No. (HRA) 74-168. Government Printing Office, 1973.
18. National Center for Health Statistics. Basic data on anthropometric measurements and angular measurements of the hip and knee joints for selected age groups 1–74 years of age, United States, 1971–1975. Vital and Health Statistics, Series 11, No. 219. DHHS publication No. (PHS) 81-1669. Government Printing Office, 1981.
19. National Center for Health Statistics. Skinfold thickness of youths 12–17 years, United States. Vital and Health Statistics, Series 11, No. 132. DHEW publication No. (HRA) 74-1614. Government Printing Office, 1974.
20. National Center for Health Statistics. Skinfold thickness of children 6–11 years, United States. Vital and Health Statistics Series 11 No. 120. DHEW publication No. (HSM) 73-1602. Government Printing Office, 1972.
21. Garn SM, Clark DC. Trends in fatness and the origins of obesity. Pediatrics 1976; 57:443–456.
22. National Center for Health Statistics. Height and weight of adults ages 18–74 years by socioeconomic and geographic variables, United States. Vital and Health Statistics, Series 11, No. 224. DHHS publication No. (PHS) 81-1674. Government Printing Office, 1981.
23. Van Itallie TB. Health implications of overweight and obesity in the United States. Ann Intern Med 1985; 103:983–988.
24. National Center for Health Statistics. Height and weight of children: Socioeconomic status, United States. Vital and Health Statistics Series 11, No. 119. DHEW publication No. (HSM) 73-1601. Government Printing Office, 1972.
25. National Center for Health Statistics: Characteristics of persons with hypertension, United States, 1974. Vital and Health Statistics Series 10, No. 121. DHEW publication No. (PHS) 79-1549. Government Printing Office, 1978.
26. National Center for Health Statistics. Dietary intake findings, United States, 1971–1974. Vital and Health Statistics, Series 11, No. 202. DHEW publication (HRA) 77-1647. Government Printing Office, 1977.
27. Feinleib M. Data bases, data banks and data dredging: The agony and the ecstacy. J Chron Dis 1984; 37:783–790.
28. National Center for Health Statistics. Obese and overweight adults in the United States. Vital and Health Statistics, Series 11, No. 230. DHHS publication No. (PHS) 83-1680. Government Printing Office, 1983.
29. Lapidus L, Bengtsson C, Larsson B et al. Distribution of adipose tissue and risk of cardiovascular disease and death: A 12 year followup of participants in the population study of women in Gothenburg, Sweden. Br Med J 1984; 189:1257–1261.
30. Blair D, Habicht J-P, Sims EAH, et al. Evidence for an increased risk for hypertension with centrally located body fat and the effect of race and sex on this risk. Am J Epidemiol 1984; 119:526–540.
31. Stallones L, Mueller WH, Christensen BL. Blood pressure, fatness, and fat patterning among USA adolescents from two ethnic groups. Hypertension 1982; 4:483–486.
32. National Institutes of Health Consensus Development Panel on the Health Implications of Obesity: Health implications of obesity. Ann Intern Med 1985; 103:1073–1077.
33. Sullivan J, Carter JP. A nutrition-physical fitness intervention program for low-income black patients. J Natl Med Assoc 1985; 77:39–43.
34. Gillum RF, Gillum BS, Smith N. Cardiovascular risk factors among urban American Indians. Am Heart J 1984; 107:765–776.
35. National Center for Health Statistics. Parity and hypertension. Vital and Health Statistics, Series 11 No. 38. DHEW publication No. (HS) 72-1024. Government Printing Office, 1972.
36. Jekel JF. The "Rainbow Reviews": Publications of the National Center for Health Statistics. J Chron Dis 1984; 37:681–688.