The High Prevalence of Obesity in Michigan Primary Care Practices
An UPRNet Study

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BACKGROUND. Obesity is a risk factor for several chronic diseases and some cancers. We suspected that patients in our primary care practices were, on the average, heavier than state and national norms.

METHODS. Rates of overweight patients in primary care practices were compared with rates from the Michigan Behavioral Risk Factor Survey (MBRFS) of 1993 and the National Health and Nutrition Evaluation Survey (NHANES) III Phase I (1988-91), the most recent state and national surveys for which summarized data were available. The 19 family practice offices of the rural Upper Peninsula Research Network (UPRNet) and two urban clinics in the Lansing area participated. We measured heights and weights of 5267 consecutive patients 18 years of age and older who visited one of the offices or clinics during the study period in 1996.

RESULTS. Fifty-three percent of the primary care patients were overweight, and 28.5% were severely overweight. The age-adjusted rates were 51.0% and 27.5%, respectively. These rates are much higher than rates reported from the MBRFS (29.1% for overweight), and NHANES III Phase I (33% overweight, 14% severely overweight). The age-adjusted prevalence of overweight and severely overweight was higher in the rural than the urban sample: 52.5% vs 47.2% for overweight and 33.7% vs 25.6% for severely overweight, respectively.

CONCLUSIONS. Compared with data from the Michigan Behavioral Risk Factor Survey of 1993 and the National Health and Nutrition Evaluation Survey III Phase I, a much larger proportion of patients visiting our primary care practices are overweight and severely overweight. The prevalence of obesity in primary care practices may be much higher than rates estimated from population-based surveys.

KEY WORDS. Obesity; body mass index; family practice; primary care. *(J Fam Pract 1998; 47:39-43)*

Obesity is a major health problem because it is a risk factor for several chronic diseases and some cancers. The National Health and Nutrition Examination Survey III Phase I (1988-1991), in which a random sample of the US population was interviewed and examined, found 33% of the population to be overweight and 14% to be severely overweight.[1] According to the Michigan Behavioral Risk Factor Survey (MBRFS), a random-digit–dialing phone survey of 2000 adults, in 1993 Michigan ranked sixth in the rate of obesity in the United States with a prevalence of 29.1% overweight.[2] However, population-based prevalence rates for overweight may not accurately reflect rates in primary care practices because overweight people may be more likely to visit their physicians than healthy-weight or underweight people. We noticed that rates of obesity in our northern Michigan practices seemed greater than state and national rates. Therefore, we wanted to obtain an estimate of the prevalence of obesity in our practices and to compare our rates with county, state, and national data.

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METHODS

Nineteen family practice offices of the Upper Peninsula Research Network (UPRNet) and two academic urban family practice offices in the Lansing area participated. UPRNet practices are located in rural and remote locations of northern Michigan in communities of 300 to 15,000. Eleven of the offices are publicly funded, rural community health centers. The populations served by these practices are typical of rural northern Michigan, with higher than the state average rates of elderly and poor patients. Approximately 95% of the regional population is white, and about 2% is Native American.

In the spring and early summer of 1996, consecutive patients 18 years of age and older visiting any of the practices were invited to participate, and informed consent was obtained. Spring and early summer was chosen to avoid heavy clothing and boots and to avoid enrolling nonresident vacationers. Patients with appointments specifically to see a dietitian, those already known to be pregnant, and those who were unable to stand on a scale were excluded from the study.

Heights were measured by one of two methods. In

method 1, height was measured with a measuring arm attached to a wall and resting on the patient's head. Patients stood with head and heels against the wall. In method 2, height was measured with a measuring arm attached to the scale. Measuring arms were checked to be certain they were parallel to the floor. If the patient was unwilling or unable to remove his or her shoes, 1/2 in. was subtracted from the measured height during data entry. Weights were taken on balance beam scales that were calibrated within 1 month before the start of the study. Patients removed their coats before stepping on the scale, and no weight adjustments were made for clothing. Each office nursing staff reviewed the correct measuring procedures before starting the study. Trained onsite study coordinators (office managers or nursing managers) supervised the data-gathering process to ensure adherence.

Body mass index (weight in kilograms divided by height in meters squared) was calculated for each participant. We classified participants as underweight, healthy weight, overweight, or severely overweight, and compared our rates with the Michigan Behavioral Risk Factor Survey (MBRFS) of 1993, the most recent year for which complete data were available at the time of our analysis. We age-adjusted the primary care patient summary rates to the MBRFS age distribution by the direct method. We also compared rates of overweight from the primary care practices to MBRFS data from the counties in which the practices are located. The county-specific comparisons used grouped MBRFS data from the 1990 to 1994 surveys.

To compare the primary care practice rates of overweight and severely overweight with a national sample, we used the National Health and Nutrition Examination Survey (NHANES) III Phase I data from 1988 to 1991, the most recent national data available. Because NHANES rates are age-adjusted by the direct method using the 1980 census data as weights, we similarly adjusted the primary care practice rates for this comparison.

The most widely accepted measure for obesity in adults is body mass index (BMI). The National Center for Health Statistics consensus report on the health implications of obesity[3] describes the following categories for BMI: underweight (BMI ≤20.7 for males, ≤19.1 for females); healthy weight (BMI >20.7 and <27.8 for males, BMI >19.1 and <27.3 for females); overweight (BMI ≥27.8 for males, ≥27.3 for females); and severely overweight (BMI ≥31.3 for males, ≥32.3 for females). These standards are used by the Behavioral Risk Factor Survey as well as NHANES III.

At the time of the office visits we administered a brief survey to gather data on household income, race, and the rates of diabetes mellitus and heart disease because of their strong association with obesity.

The University Committee on Research Involving Human Subjects of Michigan State University approved this study protocol.

RESULTS

Of 5703 adults invited, 79 (1.4%) refused to participate, and 358 (5.2%) were eliminated from analysis primarily because of failure to obtain informed consent (4.1%). The rural northern Michigan practices enrolled 4465 patients, and the urban practices enrolled 802 for a total of 5267, 1881 men and 3386 women. The mean ages of men and women enrolled were 52.1 and 49.9, respectively. Household income distribution was: < $10,000 = 27%; $10,000 to 19,999 = 23%; $20,000 to $34,999 = 23%; $35,000 to 50,000 = 14%; and > $50,000 = 13%. Prevalence of overweight by income category and comparison with MBRFS data is given in Table 1. Rates of overweight are considerably higher among the primary care practice patients in all income categories. Twenty-one percent did not report income, and the overall rate of overweight in this group did not differ significantly from the group who provided information on income.

The percentage of overweight patients for the primary care practices by age, sex, and race is given in Table 2. More than half of the men (54.5%) and women (52.6%) were overweight. BMI increased with age, with the highest percentage of overweight being men ages 45 to 54 (68.2%) and women ages 55 to 64 (67.2%). The percentage of overweight declined thereafter, and sharply after age 85. This result is similar to that of other studies of weight trends as people age, with peak weights being at about age 55 for men and about 65 for women.[4] In the private practice clinics, 52.5% of patients were overweight; in the public-funded clinics, 54.4% were overweight.

Comparisons of overweight patients between the Michigan primary care practices and the MBRFS are

TABLE 1

The Prevalence of Overweight Patients of Michigan Primary Care Practices (PCP) and in the 1993 Michigan Behavioral Risk Factor Survey (MBRFS), by Income

Income	Overweight* Patients in PCP, %	Overweight Patients in MBRFS, %
< $10,000	53.1	27.9
$10,000 - $19,999	54.8	34.9
$20,000 - $34,999	57.3	30.2
$35,000 - $50,000	54.7	29.8
> $50,000	45.5	25.4

*Overweight is defined as ≥27.8 body mass index for men and ≥27.3 body mass index for women.

TABLE 2

Percent of Patients Visiting Primary Care Practices in Northern Michigan Who Are Overweight, by Sex, Age, and Race (N = 5267)

Characteristics	Men (1025/1881) % (SD)	Women (1782/3386) % (SD)
Overweight,* unadjusted	54.5 (1.6)	52.6 (1.2)
Overweight,* age-adjusted†	49.1	50.2
Age of overweight patients, y		
18 to 24	24.6 (7.4)	30.4 (4.6)
25 to 34	44.5 (5.0)	44.1 (3.3)
35 to 44	54.1 (3.6)	48.8 (2.9)
45 to 54	68.2 (3.2)	61.3 (2.6)
55 to 64	63.3 (3.5)	67.2 (2.7)
65 to 74	61.6 (3.5)	59.8 (2.9)
75 to 84	44.6 (5.2)	54.9 (3.7)
85+	32.4 (14.1)	30.9 (9.2)
Race of overweight patients		
White, non-Hispanic (n = 4871)	54.3 (1.6)	52.7 (1.2)
African American (n = 67)	68.4 (12.9)	58.3 (9.3)
Native American (n = 102)	56.7 (12.0)	58.3 (7.6)
Hispanic (n = 32)	42.9 (28.6)	52.0 (13.9)
Other (n = 48)	27.5 (20.0)	26.6 (15.6)
N/A (n = 147)	61.4 (6.8)	50.0 (8.8)

*Overweight is defined as ≥27.8 body mass index for men and ≥27.3 body mass index for women.
†Age-adjusted to the 1980 US census.
SD denotes standard deviation; N/A denotes information not available.

given in Table 3. Patients from the primary care practices have nearly twice the rate of overweight found in the population-based MBRFS (51.5% vs 29.1%). Much higher rates of obesity in the primary care patients are noted in both men and women and in all age groups. In both surveys a slightly higher percentage of men than women were overweight.

Comparison of the primary care practice overweight rates with rates from county-specific data of the MBRFS gave similar results. The overall rate of overweight in the 11 counties in which the practices are located was 30.1% according to grouped MBRFS data from 1990 to 1994, compared with the age-adjusted rate of 51.5% in the primary care practices.

Comparison of the Michigan primary care practice data with national data from Phase I of NHANES III revealed equally striking differences in obesity. For white, non-Hispanics in the 20 to 74 age group, NHANES III found that 31.6% of men and 32.1% of women were overweight. For this same age group, 49.1% of men and 50.2% of women in our primary care practices were overweight (all rates age-adjusted to 1980 US census data). The rates of severely overweight patients in the primary care practices are given in Table 4. The age-adjusted rates for this group were 30% for men and 26.6% for women, compared with rates of 8% for men and 10.8% for women in Phase I of NHANES III.[1] Data on severely overweight people were not available from the MBRFS.

Since we weighed people in light street clothes, we wondered if clothing biased the weight measurements. We also wondered if a sizable proportion of the overweight and severely overweight patients from the practices were "just slightly overweight." Therefore, we subtracted 5 and 15 pounds, respectively, from each participant's weight and recalculated the percentages of overweight and severely overweight. Subtracting 5 pounds, which would more than compensate for clothing, decreased the prevalence of overweight by 7% in men and 5% in women and decreased the prevalence of severely overweight by 4% in men and 3% in women. After subtracting 15 pounds, 36.4% of men and 39% of women remained overweight, and 17.7% of men and 19% of women remained severely overweight. These rates are well above the state and national rates.

We then compared rates of overweight in the rural practices with the two urban practices. The age-adjusted rate of overweight in the rural northern Michigan practices was higher than the rate in the urban Lansing primary care

TABLE 3

Comparison of Rates of Overweight Patients Between Michigan Primary Care Practices and the 1993 Michigan Behavioral Risk Factor Survey (MBRFS)

Characteristics	PCP % (SD)	MBRFS % (SD)
Overweight,* unadjusted	53.3 (0.9)	29.1 (1.0)
Overweight,* age-adjusted†	51.5	
Age of overweight patients, y		
18 to 24	28.7 (3.9)	14.1 (2.3)
25 to 34	44.2 (2.8)	26.1 (2.1)
35 to 44	50.7 (2.2)	30.5 (2.2)
45 to 54	63.8 (2.0)	39.2 (2.7)
55 to 64	65.7 (2.1)	41.0 (3.0)
65 to 74	60.5 (2.2)	30.7 (3.1)
75+	47.4 (2.9)	19.7 (3.6)
Sex of overweight patients		
Male	54.5 (1.6)	29.5 (1.5)
Female	52.6 (1.2)	28.7 (1.4)
Race of overweight patients		
White	53.2 (1.0)	27.4 (1.1)
African American	61.2 (7.6)	43.7 (3.6)

*Overweight is defined as ≥27.8 body mass index for men and ≥27.3 body mass index for women.
†Age-adjusted to the 1980 US census.
SD denotes standard deviation.

TABLE 4

Rate of Severely Overweight Primary Care Patients, by Age and Sex

	Men (544/1881) % (SD)	Women (960/3386) % (SD)	Combined (1504/5267) % (SD)
All severely overweight* patients, unadjusted	28.9 (1.9)	28.3 (1.5)	28.5 (1.2)
All severely overweight patients, age-adjusted†	30.0	26.6	27.5
Age, y			
18 to 24	13.8 (7.9)	11.6 (5.1)	12.2 (4.3)
25 to 34	23.2 (5.9)	24.6 (3.9)	24.1 (3.2)
35 to 44	27.3 (4.6)	31.1 (3.3)	29.7 (2.7)
45 to 54	40.1 (4.4)	36.7 (3.4)	37.9 (2.7)
55 to 64	35.4 (4.6)	36.7 (3.7)	36.2 (2.9)
65 to 74	33.1 (4.6)	28.4 (3.8)	30.3 (2.9)
75 +	16.4 (5.9)	21.4 (4.4)	19.5 (3.5)

*Severely overweight is defined as ≥31.3 body mass index for men and ≥32.3 body mass index for women.
†Age-adjusted to the 1980 US census.
SD denotes standard deviation.

practices (52.5% vs 47.2%). These rates are both much higher than the county-specific rates for overweight from the MBRFS: 35.9% for the rural counties and 25.2% for the urban county. The rate of severely overweight was 4% higher in the rural practices than the urban practices (29.2% vs 25.2%).

Because we were concerned that a higher prevalence of heart disease and diabetes mellitus among the primary care patients might skew upward their weight distribution, we recalculated the percentage of overweight after eliminating patients with heart disease and diabetes. The unadjusted rate of overweight dropped only 3.2% (53.3% to 50.1%), and was still far above national or state rates.

DISCUSSION

We identified only three previous studies describing rates of obesity in family practice offices. In a small midwestern community, the rate of overweight of 276 patients in one group practice was 46% in adults aged 40 and older, and the BMI distributions by age and sex did not differ significantly from NHANES II data.[5] Two other studies found higher than expected rates of obesity in primary care patients. McArtor and colleagues[6] found that 25.5% of 2746 patients aged 18 to 59 in northeast Ohio had a BMI of ≥30. Logue et al[7] studied 414 patients aged 45 and older in one private practice, and 57% of these patients were classified as overweight using the same criteria we used. The data from these latter two studies are not age-adjusted, and no comparison data are provided. Nonetheless, their findings of higher than expected rates of obesity in office patients compared with national population-based data are consistent with ours..

The rates of overweight and severely overweight in these Michigan primary care offices are much greater than one would predict on the basis of population-based surveys. However, there are potential biases in these comparisons. We have mentioned that clothing probably had a small effect on the prevalence. Although we age-adjusted our data, none of our comparisons are perfect because of different methods of sampling and different timing of data collection. Our rates are more contemporary, however, than Phase I of NHANES (1988-1991) or the MBRFS of 1993. Because the MBRFS was a phone survey, weights may be underreported, but investigators have found self-report of weight and height to be fairly accurate.[8,10] Moreover, NHANES data are gathered by actual measurement, as are our data. Because our data are more contemporary than the MBRFS and NHANES III, and because average BMI in the United States is increasing,[8,11] we have probably slightly overestimated the differences in overweight between our primary care office patients and population-based estimates. The prevalence of overweight in the United States increased 8% from NHANES II (1976-1980) to Phase I of NHANES III (1988-1991).

Because obese patients are more likely to have chronic diseases, and because patients with chronic diseases are more likely to visit their physicians more frequently, we may have oversampled heavier patients of the practices. But even after eliminating patients with established diagnoses of diabetes and heart disease, the unadjusted rate of overweight patients visiting the primary care practices was very high, 50.1%.

Our estimate of 50% prevalence of obesity may be a significant underestimation of the problem because we used BMI as the standard. Waist-hip ratio is a measure of central obesity, which correlates better than BMI with increased risk of diabetes and coronary artery disease; but waist-hip ratio does not correlate well with BMI. Using the same cutoffs of BMI for overweight that we used (27.3 for women and 27.8 for men), Logue found that a BMI that indicated the overweight category did not identify patients with central obesity in 28% of men and 38% of women.[7] Moreover, women's optimal weight for longevity is considerably less than the cutoffs for overweight. Optimal longevity in a cohort study of 115,195 women in the Nurses Health Study occurred in those weighing at least 15% less than the US average.[15] This would suggest that as many as 80% of our primary care patients might benefit from sustained weight loss.

Another important observation is that, in most age groups, the prevalence of overweight and severely

overweight is as great or greater in men than in women. Yet, because of our cultural attitudes, women are more worried about their weight and diet more frequently. How can we encourage men to stay trim?

We suspect that these much higher rates of overweight and severely overweight in primary care practices compared with population-based survey data are typical for primary care practices across the nation. This phenomenon has not been previously described, so the reasons we give here are speculative. Overweight people may have more medical problems and health concerns than those patients who are not overweight. Obvious comorbidities include diabetes and heart disease. As we have described, these diseases account for only a small percentage of the increased prevalence of overweight in primary care practices; other medical conditions such as osteoarthritis and hypertension may contribute. Mental health issues may also represent a significant component, but studies exploring the relationship between obesity and psychological functioning have yielded inconsistent results.[16-21] Friedman and Brownell[22] believe that the entire terrain of obesity and mental health has been inadequately explored. Somatization disorder may be more common in obese individuals. Perhaps the obese are more worried about their health and are overrepresented among the "worried well" who visit our practices.

An optimistic finding is that a modest weight loss of 15 pounds per person would markedly reduce the prevalence of overweight and severely overweight in our patients from 53% to 38% and from 28% to 18%, respectively. Perhaps we should focus our efforts on limited weight loss targets. A higher prevalence of overweight in rural areas may reflect greater reliance on the automobile for transportation. A "Walk America"-type campaign could be quite effective for limited weight loss.

We have demonstrated that the burden of overweight and, therefore, overweight-related illnesses faced daily by primary care physicians in the United States appears much greater than previously estimated from population-based surveys. This observation requires confirmation in other regions of the country. Overrepresentation of overweight individuals in primary care practices may not be fully explained by the known association of obesity with certain chronic diseases. Further research is needed to understand the complex interplay between overweight, overweight-related medical and mental health conditions, and the health-seeking behavior of obese individuals.

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