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Prevalence of Overweight and Obesity among Women of Childbearing Age:

Results from the 2002 National Survey of Family Growth

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Abstract

Objective—To estimate the prevalence of overweight and obesity among U.S. women of childbearing age.

Methods—Our study population was drawn from the 2002 National Survey of Family Growth (NSFG) and consisted of non-pregnant female respondents aged 20–44 years with a valid body mass index (BMI) (N=5958). Univariate and bivariate analyses were conducted to document variations in the prevalence of overweight and obesity by age, race and Hispanic origin, and socioeconomic status.

Results—Overall, 24.5% of women 20–44 years of age were overweight (BMI 25.0–29.9 kg/m²) and 23.0% were obese (BMI ≥ 30.0 kg/m²). Among those who were obese, 10.3% met the criteria for class II or III obesity (BMI ≥ 35.0 kg/m²). Non-Hispanic black and women were 2.25 times more likely to be overweight or obese compared to non-Hispanic white women (95% CI: 1.87, 2.69). This disparity in risk between non-Hispanic black and non-Hispanic white women declined and no longer achieved statistical significance after adjustment for education, household income, and health insurance coverage.

Conclusions—Nearly one in two U.S. women of childbearing age are either overweight or obese. The racial/ethnic disparity in prevalence rates may be due in part to variability in educational attainment, household income, and stability of health insurance coverage.

Keywords

body weight; epidemiology; health care surveys; women's health

Introduction

The increasing prevalence of overweight and obesity is a critical public health problem for women of childbearing age. Obesity has been associated with both short- and long-term health effects for women as well as for their offspring. Existing research supports a link between obesity and conditions that impair a woman's ability to conceive and increase her risk for an adverse pregnancy outcome (1,2). Furthermore, this chronic condition has been linked to the development of diabetes and cardiovascular disease later in life (3).

Clinical decision-making and public health policy and education are driven in part by the prevalence of the condition in the general population. Current prevalence rates for overweight and obesity are publicly available based on data from the National Health and Nutrition

Examination Survey (NHANES) and highlight a disparity in risk by race and Hispanic origin status. However, it is unclear whether these rates are influenced by differences in socioeconomic status. Thus, this article presents prevalence data on women of childbearing age, adjusted for age, race and Hispanic origin status, educational attainment, household income, and stability of health insurance coverage from the 2002 National Survey of Family Growth (NSFG), an underutilized, nationally representative survey of individuals in the United States.

Materials and Methods

The NSFG is a periodic survey designed and administered by the National Center for Health Statistics (NCHS). The 2002 survey was designed to obtain detailed information on factors affecting childbearing, marriage, and parenthood from a national probability sample of 12,571 non-institutionalized men and women 15 to 44 years of age. Most of the survey was administered using computer-assisted personal interviewing, a technique in which a trained interviewer asked participants questions and entered the responses into a notebook computer (4). A detailed description of the 2002 NSFG sample design and sampling weights is provided elsewhere (4).

The 2002 NSFG fully weighted response rate was 70% for female participants (5). For this analysis, we restricted our sample to non-pregnant female respondents 20 to 44 years of age with a valid body mass index (BMI) (N=5958). The NCHS did not compute a BMI for pregnant respondents because their weights at the time of interview did not reflect their usual weight (6). A BMI value was not computed for non-pregnant female respondents less than 20 years of age because the appropriate method to assess weight for height in adolescents (standardized growth curves for age) is different from the standard approach used to calculate BMI in adults (6).

All participants were asked their height and weight at the time of interview. This information was included in the private file and available to researchers upon written request. Data cleaning measures were performed by the NCHS staff to account for some extremely high and low values reported (based on the 5th and 95th percentiles). In particular, height for females was bottom-coded at 60 to indicate “60 inches or less” and top-coded at 70 to indicate “70 inches or more”. Weight for females was bottom- and top-coded at 108 pounds and 240 pounds, respectively (6). For the purposes of this analysis, BMI was recoded as a categorical variable based on the World Health Organization’s obesity classification for adults (7) and consisted of the following levels (with unweighted frequencies reported): underweight (n=132), < 18.5 kg/m²; normal (n=2898), 18.5-24.9 kg/m²; overweight (n=1523), 25.0-29.9 kg/m²; class I obesity (n=795), 30-34.9 kg/m²; class II or III obesity (n=610), ≥ 35.0 kg/m².

As this analysis involved the use of a public-use dataset stripped of identifiers, the University of Michigan Institutional Review Board classified this research as “non regulated”; thus, formal approval was not required. All analyses were performed using SAS Version 9.1 for Windows (SAS Institute Inc., Cary, NC). Univariate and multivariate analyses were conducted to ascertain demographic characteristics of the study population and to document variations in the prevalence of overweight and obesity by age, race and Hispanic origin, and stability of health insurance coverage during the past 12 months. The SURVEYFREQ procedure in SAS was used to perform the above mentioned analyses. To assess the odds of being overweight or obese (compared to underweight or within normal range) according to one’s age, race and Hispanic origin, educational attainment, household income, and stability of health insurance coverage, we used the SURVEYLOGISTIC procedure in SAS to generate odds ratios and 95% confidence intervals. For all analyses, the data were weighted to adjust for the survey design, sampling, coverage, and response rates so that accurate national estimates can be made from

the sample. Thus, the data presented can be generalized to all U.S. non-pregnant, non-institutionalized women 20-44 years of age.

Results

Thirty-six percent of women in our study population were 20-29 years of age, 40.8% were 30-39 years of age, and 23.5% were 40-44 years of age. The racial and Hispanic origin composition of our sample reflected that of the national population for this sex and age group: 67.5% of women were non-Hispanic white, 13.8% were non-Hispanic black, 5.0% were non-Hispanic other, and 13.6% were Hispanic. Fifteen percent of women had less than a 12th grade education, 20.7% had a 12th grade education, and 64.3% had greater than a 12th grade education. Sixteen percent of women indicated that they were still enrolled in school. Seventy-two percent of women were employed at the time of the interview. Twenty-four percent of women reported that they experienced a lack of health insurance coverage at some point in the last 12 months, and nearly one in two (48.4%) women in this subgroup indicated that they were uninsured throughout the past 12 months.

Table 1 includes prevalence data on body mass for our study population, stratified by both age and race and Hispanic origin. Overall, 24.5% of women 20-44 years of age were overweight and 23.0% were obese. Among those who were obese, 10.3% met the criteria for class II or III obesity. The prevalence of both overweight and obesity increased with age; the prevalence of overweight ranged from 20.4% in 20-29 year olds to 26.9% in 40-44 year olds. Similarly, the prevalence of obesity increased across age, ranging from 19.1% in 20-29 year olds to 25.6% in 40-44 year olds. When stratified by race and Hispanic origin, the prevalence of overweight and obesity respectively was highest among non-Hispanic black women (30.0% and 34.1%), followed closely by Hispanic (29.7% and 22.2%), non-Hispanic white (22.8% and 21.4%), and non-Hispanic other women (17.4% and 15.2%). Age trends persisted in this stratified analysis.

Table 2 includes prevalence data on body mass for our study population, stratified by both race and Hispanic origin and the respondent's stability of health insurance coverage. Consistent coverage was defined as no lapse in health insurance coverage over the past 12 months, while inconsistent coverage was defined as having a period in the past 12 months in which the respondent was without health insurance coverage. Overall, the prevalence of overweight and obesity was higher among those with inconsistent health insurance coverage. When stratified by race and Hispanic origin, this trend persisted among non-Hispanic white women, but not necessarily among minority women. For example among non-Hispanic black women, the prevalence of overweight was higher among those with inconsistent health insurance coverage. However, the prevalence of obesity was higher among those with consistent coverage. In contrast, the prevalence of overweight and class I obesity in Hispanic women was higher among those with consistent coverage, but the prevalence of class II obesity was higher among those with inconsistent coverage.

Table 3 presents the results from unadjusted logistic regression analyses, comparing the odds of being overweight or obese compared to underweight or within normal range in this study population, according to race and Hispanic origin, age, educational attainment, household income, and stability of health insurance coverage. Non-Hispanic black women were 2.25 times more likely to be either overweight or obese compared to non-Hispanic white women. Hispanic women were 1.36 times more likely to be either overweight or obese than non-Hispanic white women. Both of these findings were statistically significant. As noted earlier, the odds of being overweight or obese significantly increased with age, ranging from 1.61 times higher among women 30-39 years of age to 1.69 times higher among women 40-44 years of age, compared to women 20-29 years of age. Additional analyses by educational attainment

showed that women who had more than a high school education had 27% lower odds of being overweight or obese compared to women with only a 12th grade education.

When we restricted our sample to women who had a) a high school education or less and b) inconsistent health insurance coverage in the past 12 months, as a proxy for lower socioeconomic status, the disparity in the odds of overweight and obesity between non-Hispanic white and black women narrowed and was borderline statistically significant. Moreover, the disparity between Hispanic and non-Hispanic white women disappeared. When we restricted our sample to women who had a) a high school education or less and b) no health insurance coverage during the past 12 months, the disparity in the odds of overweight and obesity between non-Hispanic black and white women narrowed further and was no longer statistically significant. Household income, another indicator of socioeconomic status, was substituted for educational attainment and demonstrated similar results.

Discussion

Our prevalence estimates are consistent with those from Ogden and colleagues, who recently published prevalence data from NHANES 1999-2004 (8). In their analysis of 2003-2004 NHANES data specifically, 51.7% of non-pregnant women aged 20-39 years were overweight or obese ($\text{BMI} \geq 25 \text{ kg/m}^2$), 28.9% were obese ($\text{BMI} \geq 30 \text{ kg/m}^2$) and 8.0% were extremely obese ($\text{BMI} \geq 40 \text{ kg/m}^2$) (8). Further analyses by race and Hispanic origin showed that non-Hispanic black women (73.7%) and Mexican American women (69.3%) had a higher prevalence of overweight and obesity compared to non-Hispanic white women (45.6%) (8). A limitation of this analysis was that it did not include information on socioeconomic status.

Prevalence rates reported in the latest NHANES analysis are slightly higher than those from our NSFG-based analysis. A possible explanation may be that as part of the NHANES survey protocol, participants are given a physical examination that included height and weight assessments using standardized protocols and calibrated equipment. In contrast, the height and weight measurements from the NSFG are based on self-report. However, self-reported measures of weight are considered to be relatively accurate estimates of measured values among the general adult population (9,10); however, age differences exist. Women generally underreport their weight by 1.0 kg on average, but younger women underreport their weight more than older women (9). In addition, the difference between self-reported and measured values is related to an individual's overweight status as well, as severely overweight or obese women tend to underreport their weight. Thus, there is the potential for some overweight women to be misclassified as normal weight and obese women to be misclassified as overweight because of the underestimation of weight in the numerator, but it should be limited.

For this analysis, we considered factors such as educational attainment, household income, and stability of health insurance coverage as socioeconomic indicators. In doing so, we acknowledge that there are numerous approaches to studying the effects of socioeconomic status on health behaviors, and that these factors can have an impact not only the individual level, but also at the community and health system level (11). In this analysis, the relationship between race/ethnicity and overweight/obesity was similar whether we adjusted the model for educational attainment or household income.

These data suggest that there was variation in the prevalence of overweight and obesity according to race and Hispanic origin after the stability of her health coverage was considered over the past year. Specifically, these data suggest that the prevalence of obesity among non-Hispanic black women was higher for those with consistent health insurance coverage than for those with inconsistent health insurance coverage. This finding is different from the overall

trend reported and from that of non-Hispanic white women. Similarly, a similar pattern was present for Hispanic women, as the prevalence of overweight and class I obesity was higher among those with consistent health insurance coverage. It is possible that such trends may be due in part to cross cultural differences in norms pertaining to ideal body image, wellness, and financial security (12,13). A further exploration of this hypothesis is beyond the scope of this study, but warrants further attention.

In sum, the prevalence of overweight and obesity among women of childbearing age remains a critical public health concern. Our findings confirm those reported in NHANES analyses and reinforce the need for further attention to the health and wellbeing of women of childbearing age. Moreover, the racial and ethnic disparity in prevalence rates may be partially explained by variability in educational attainment, household income, and stability of health insurance coverage. Further efforts to design and implement health education campaigns need to address both the complexities of the obesity epidemic and how factors such as socioeconomic status, health insurance, and cultural norms affect health behavior. This approach may provide the best opportunity to inform and promote healthy eating and a healthy lifestyle across the lifespan.

References

1. Zaadstra BM, Seidell JC, Van Noord PA, te Velde ER, Habbema JD, Vrieswijk B, Karbaat J. Fat and female fecundity: prospective study of effect of body fat distribution on conception rates. *BMJ* 1993;306:484–487. [PubMed: 8448457]
2. Catalano PM. Management of obesity in pregnancy. *Obstet Gynecol* 2007;109:419–433. [PubMed: 17267845]
3. U.S. Department of Health and Human Services. The Surgeon General's call to action to prevent or decrease overweight and obesity. U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General; Rockville, MD: 2001.
4. National Center for Health Statistics. User's Guide. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; Hyattsville, MD: 2004. Public use data file documentation: National Survey of Family Growth Cycle 6: 2002.
5. Lepkowski JM, Mosher WD, Davis KE, Groves RM, van Hoewyk J, Willem J. National Survey of Family Growth, Cycle 6: Sample Design, weighting, imputation, and variance estimation. *Vital Health Stat* 2006;2:1–92.
6. National Center for Health Statistics. User's Guide and Documentation. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; Hyattsville, MD: 2005. National Survey of Family Growth Cycle 6: 2002 ACASI File; p. 1-97.
7. World Health Organization. Report of a WHO Expert Committee. World Health Organization; Geneva: 1995. Physical status: the use and interpretation of anthropometry. WHO Technical Report Series 854
8. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA* 2006;295:1549–1555. [PubMed: 16595758]
9. Kuczmarski MF, Kuczmarski RJ, Najjar M. Effects of age on validity of self-reported height, weight, and body mass index: Findings from the third National Health and Nutrition Examination Survey, 1988-1994. *JAMA* 2001;101:28–34.
10. Rowland ML. Self-reported weight and height. *Am J Clin Nutr* 1990;52:1125–1133. [PubMed: 2239790]
11. Savitz DA, Kaufman JS, Dole N, Siega-Riz AM, Thorp JM Jr, Kaczor DT. Poverty, education, race, and pregnancy outcome. *Ethn Dis* 2004;14:322–329. [PubMed: 15328932]
12. Duncan GE, Anton SD, Newton RL Jr, Perri MG. Comparison of perceived health to physiological measures of health in Black and White women. *Prev Med* 2003;36:624–628. [PubMed: 12689808]
13. Wang Y, Beydoun MA. The obesity epidemic in the United States - gender, age, socioeconomic, racial/ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiol Rev* 2007;29:6–28. [PubMed: 17510091]

Table 1
Body mass index stratified by age and race and Hispanic origin, National Survey of Family Growth, 2002 *

	All (20-44 y)	20-29 y	30-39 y	40-44 y
All				
Underweight	2.3 (0.3)	3.7 (0.6)	1.5 (0.3)	†
Normal	50.2 (1.1)	56.6 (1.4)	47.1 (1.4)	45.9 (2.5)
Overweight	24.5 (0.8)	20.4 (1.2)	26.5 (1.1)	26.9 (1.8)
Class I obesity	12.7 (0.7)	11.8 (0.8)	13.3 (0.8)	12.8 (1.5)
Class II or III obesity	10.3 (0.5)	7.3 (0.6)	11.5 (0.9)	12.8 (1.5)
Non-Hispanic White				
Underweight	2.1 (0.4)	3.3 (0.7)	1.5 (0.4)	†
Normal	53.6 (1.3)	59.7 (1.9)	50.6 (1.9)	50.4 (3.1)
Overweight	22.8 (1.0)	19.7 (1.7)	23.4 (1.3)	25.8 (2.3)
Class I obesity	11.6 (0.8)	10.9 (1.1)	12.0 (1.1)	11.9 (1.7)
Class II or III obesity	9.8 (0.7)	6.2 (0.8)	12.4 (1.3)	10.5 (1.5)
Non-Hispanic Black				
Underweight	2.6 (0.7)	3.9 (1.7)	†	†
Normal	33.2 (1.7)	44.6 (2.8)	27.5 (2.2)	24.3 (3.9)
Overweight	30.0 (1.5)	19.6 (2.2)	38.3 (2.5)	32.5 (3.6)
Class I obesity	17.5 (1.3)	19.4 (2.2)	16.7 (2.0)	15.5 (2.6)
Class II or III obesity	16.6 (1.4)	12.5 (1.8)	16.0 (2.0)	25.0 (4.2)
Non-Hispanic Other				
Underweight	5.8 (2.3)	11.8 (5.0)	†	†
Normal	61.5 (5.4)	63.2 (6.4)	27.5 (2.2)	53.6 (15.4)
Overweight	17.4 (3.1)	14.3 (3.4)	38.3 (2.5)	†
Class I obesity	9.0 (2.8)	†	16.7 (2.0)	†
Class II or III obesity	6.2 (2.7)	†	†	†
Hispanic				
Underweight	1.8 (0.4)	2.4 (0.8)	†	†
Normal	46.3 (1.8)	53.0 (3.0)	43.0 (2.7)	37.3 (4.3)
Overweight	29.7 (1.9)	26.1 (2.7)	31.0 (2.9)	35.2 (4.3)
Class I obesity	14.2 (1.2)	11.1 (1.4)	17.9 (2.3)	13.3 (3.0)
Class II or III obesity	8.0 (1.1)	7.3 (1.2)	6.7 (1.3)	12.5 (3.4)

Values are weighted percentages (standard error). Underweight, < 18.5 kg/m²; normal, 18.5-24.9 kg/m²; overweight, 25.0-29.9 kg/m²; class I obesity, 30-34.9 kg/m²; class II or III obesity, ≥ 35.0 kg/m².

* Percentages may not sum to 100 due to rounding.

† Unweighted frequency was less than 10.

Table 2
Body mass index stratified by race and Hispanic origin and stability of health insurance coverage, National Survey of Family Growth, 2002 *

	Consistent Coverage	Inconsistent Coverage
All		
Underweight	2.2 (0.3)	2.6 (0.6)
Normal	51.5 (1.2)	46.3 (1.7)
Overweight	23.9 (0.9)	26.1 (1.4)
Class I obesity	12.3 (0.7)	13.6 (1.1)
Class II or III obesity	10.0 (0.6)	11.4 (1.2)
Non-Hispanic White		
Underweight	1.9 (0.3)	2.6 (0.9)
Normal	55.0 (1.5)	48.1 (2.3)
Overweight	22.6 (1.1)	23.6 (2.1)
Class I obesity	11.1 (0.8)	13.8 (1.7)
Class II or III obesity	9.3 (0.8)	11.8 (1.7)
Non-Hispanic Black		
Underweight	1.8 (0.4)	5.0 (2.3)
Normal	34.1 (2.1)	31.2 (2.8)
Overweight	28.9 (1.8)	32.7 (3.4)
Class I obesity	18.0 (1.5)	16.1 (2.3)
Class II or III obesity	17.3 (1.6)	14.9 (2.8)
Non-Hispanic Other		
Underweight	†	†
Normal	62.4 (5.9)	60.0 (9.8)
Overweight	15.3 (2.7)	26.7 (10.5)
Class I obesity	9.3 (3.3)	†
Class II or III obesity	6.6 (3.2)	†
Hispanic		
Underweight	2.5 (0.7)	†
Normal	44.3 (2.1)	49.1 (2.9)
Overweight	31.0 (2.5)	27.8 (2.5)
Class I obesity	15.0 (1.8)	13.1 (1.6)
Class II or III obesity	7.2 (1.2)	9.2 (1.7)

Values are weighted percentages (standard error). Underweight, < 18.5 kg/m²; normal, 18.5-24.9 kg/m²; overweight, 25.0-29.9 kg/m²; class I obesity, 30-34.9 kg/m²; class II or III obesity, ≥ 35.0 kg/m². Consistent coverage is defined as no interruption in health insurance coverage during the past 12 months. Inconsistent coverage is defined as an interruption of at least one month in health insurance coverage during the past 12 months.

* Percentages may not sum to 100 due to rounding.

† Unweighted frequency was less than 10.

Table 3
The odds of being overweight or obese among non-pregnant women 20-44 years of age, National Survey of Family Growth, 2002

	<u>Odds Ratio (95% Confidence Interval)</u>
Age	
20-29 y	1.00
30-39 y	1.61 (1.38, 1.89)
40-44 y	1.69 (1.35, 2.12)
Education	
< 12 th grade	0.99 (0.76, 1.29)
12 th grade	1.00
> 12 th grade	0.73 (0.58, 0.92)
Total Annual Household Income	
< \$20,000	1.31 (1.08, 1.59)
\$20,000 - \$34,999	1.41 (1.16, 1.70)
\$35,000 - \$49,000	1.33 (1.03, 1.72)
> \$49,000	1.00
Health Insurance Coverage in the Past 12 Months	
Inconsistent vs. consistent	1.21 (1.02, 1.44)
None vs. some	0.98 (0.74, 1.29)
Race and Hispanic Origin	
Non-Hispanic white	1.00
Non-Hispanic black	2.25 (1.87, 2.69)
Non-Hispanic other	0.61 (0.38, 0.98)
Hispanic	1.36 (1.13, 1.64)
Race and Hispanic Origin *	
Non-Hispanic white	1.00
Non-Hispanic black	1.73 (1.04, 2.88)
Non-Hispanic other	0.49 (0.15, 1.60)
Hispanic	0.99 (0.66, 1.47)
Race and Hispanic Origin **	
Non-Hispanic white	1.00
Non-Hispanic black	1.58 (1.07, 2.33)
Non-Hispanic other	0.32 (0.13, 0.77)
Hispanic	1.10 (0.77, 1.57)
Race and Hispanic Origin ***	
Non-Hispanic white	1.00
Non-Hispanic black	1.33 (0.71, 2.52)
Non-Hispanic other	0.84 (0.20, 3.54)
Hispanic	1.08 (0.64, 1.83)
Race and Hispanic Origin ****	
Non-Hispanic white	1.00
Non-Hispanic black	1.27 (0.76, 2.11)

	<u>Odds Ratio (95% Confidence Interval)</u>
Non-Hispanic other	0.24 (0.08, 0.75)
Hispanic	1.02 (0.63, 1.67)

Odds ratios compare the odds of being overweight or obese ($\text{BMI} \geq 25.0 \text{ kg/m}^2$) compared to the odds of being underweight or normal weight ($\text{BMI} < 25.0 \text{ kg/m}^2$).

* Sample restricted to women with a high school education or less and inconsistent health insurance coverage in the past 12 months (N=801).

** Sample restricted to women with an annual household income of less than \$50,000 and inconsistent health insurance coverage in the past 12 months (N=1115).

*** Sample restricted to women with a high school education or less and no health insurance coverage in the past 12 months (N=476).

**** Sample restricted to women with an annual household income of less than \$50,000 and no health insurance coverage in the past 12 months (N=595).