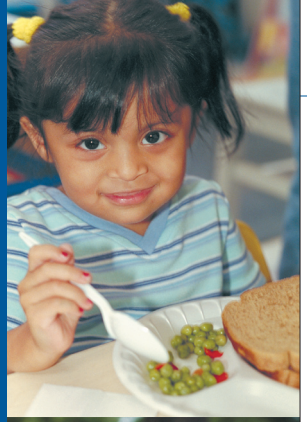



Number 13, July 2007

Overweight and Obesity *in the South*

Prevalence and Related Health Care Costs Among Population Groups

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Overweight and obesity are leading public health concerns in the United States. Although overweight and obesity are preventable conditions in the majority of cases, their prevalence has increased significantly over the past two decades. Recent estimates indicate that 34.1 percent of Americans are classified as overweight, while 32.2 percent are classified as obese [17]. National estimates of obesity-related health care costs are alarming, yet, to date, no such estimates have been published for the Southern region overall or for population groups in the South. The Southern states have some of the highest rates of adult obesity in the nation.

The objectives of this study were to determine the prevalence of overweight and obesity in the Southern region for adults overall and for population groups, and to estimate overweight- and obesity-related health care expenses for adults overall and for population groups, including age, gender, race/ethnicity, education and income groups. We believe the current study will further our understanding of the magnitude of overweight and obesity in the South and their impact on health care spending for population groups in this region.

Current Status

Overweight and obesity are associated with a number of serious and costly chronic medical conditions, including type 2 diabetes, cardiovascular disease, hypertension and certain cancers [6,16,26]. The economic impact of overweight and obesity on the health care system is staggering. A 2001 review of literature estimated that obesity accounted for 5.5 to 7.0 percent of U.S. health care expenditures [24]. More recently, obese adults were found to incur medical expenditures that were 36 percent higher than those of normal weight adults [22]. In 1998, overweight- and obesity-attributable medical spending accounted for 9.1 percent of total U.S. medical expenditures, which translated into $93 billion in 2002 [7].

Rates of overweight and obesity have increased in all gender, age and racial groups, with the highest rates in non-Hispanic black women [17]. Bungum et al. [3] assessed the role of body mass index (BMI, kg/m2) in combination with sociodemographic factors in predicting health care costs and found that BMI was the only significant predictor of costs and that age, gender, education and race did not add significantly to the predictive model. However, Paeratakul et al. [19] reported that although health risks increased with level of obesity in

This special food assistance policy series has been funded in part by the USDA Economic Research Service in partnership with the Southern Rural Development Center.

all populations, the specific degree of weight-related risk varied depending on gender, race and socioeconomic status. Among groups/populations most at risk were blacks and those with lower income and level of education. Thus, weight-related disease burden, and therefore medical costs, may vary depending on sociodemographic factors.

Data Sources

The data sources and procedures employed in this study were similar to those used in the national study by Finkelstein, Fiebelkorn and Wang [7]. Two nationally representative data sets were used in this analysis: the Medical Expenditure Panel Survey (MEPS) and the National Health Interview Survey (NHIS). MEPS, co-sponsored by the Agency for Healthcare Research and Quality and the National Center for Health Statistics, is a nationally representative survey of the civilian, non-institutionalized population that collects data about healthcare utilization and annual medical spending, including the percentage of spending by out-of-pocket and third-party payers. MEPS contains information about insurance status, region (Northeast, Midwest, South and West) and sociodemographic characteristics.

Each year, the sample for the MEPS Household Survey is derived from the previous year's NHIS. For example, the sample for the 1998 MEPS survey was derived from the 1996-1997 NHIS. Height and weight data, necessary to determine the BMI, are available for a subset of adult NHIS participants and can be linked to the MEPS data. For purposes of this analysis, and in order to maximize the sample size, we pooled MEPS/NHIS linkage files for the 1996-2000 period. We included adults residing in the Southern states, which include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia. Pregnant women and individuals with missing height and weight data were excluded. The final analysis sample included 20,307 adults 19 years of age and older with weighting variables that allowed for generating regionally representative estimates.

Procedures

NHIS data were used to determine the prevalence of each BMI category [underweight (BMI <18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25.0-29.9), or obese (BMI ≥ 30)] for all adults and for population groups for the 1996 to 2000 period overall. NHIS data were also used to determine the prevalence of each BMI category for all adults in each of the five years.

Our analysis included each individual's age, gender, race/ethnicity (white, black, Hispanic, Asian, other), household income (less than 100 percent of poverty, 100-199 percent, 200-399 percent, 400 percent or more), and education (less than college graduate, college graduate, masters or doctoral degree, other degree, missing degree), as well as interaction terms between BMI category and population subgroup.

The analyses estimated the effect of overweight and obesity on health care spending. We estimated the per capita increase in health care spending due to overweight and obesity for each population subgroup. The percentage of aggregate expenditures attributable to overweight (or obesity) in each population group was then computed by dividing aggregate predicted expenditures attributable to overweight (or obesity) by total predicted expenditures for all people in the specific group.

Major Findings

Table 1 below presents the prevalence of each BMI category by year for all adults in the South. For the overall sample (1996-2000), 35.8 percent of adults were overweight and 19.1 percent were obese. Thus, 54.9 percent of adults overall were overweight or obese. Obesity rates increased during this five-year period from 18.1 percent in 1996 to 21.5 percent in 2000 – a change of 19 percent.

Table 2 at right presents the prevalence of each BMI category by age group, gender and race/ethnicity. The prevalence of overweight and obesity combined was 61.7 percent in the 45-

Table 1. ***Prevalence of Each BMI Category Among Adults in the South by Year (1996-2006)****

	Underweight	Normal	Overweight	Obese
Body Mass Index (BMI)	**<18.5**	**18.5-24.9**	**25.0-29.9**	**≥30.0**
Unweighted N	439	8,264	7,339	4,265
Overall (1996-2000)	2.4%	42.7%	35.8%	19.1%
1996	2.5%	44.8%	34.7%	18.1%
1997	2.8%	43.0%	35.8%	18.5%
1998	2.5%	40.8%	37.1%	19.7%
1999	1.7%	41.6%	37.1%	19.6%
2000	2.3%	41.6%	34.7%	21.5%

*Based on data from the National Health Interview Survey (NHIS).

64 age group. The prevalence of overweight was 16 percentage points higher among males than females, while the prevalence of obesity was 2 percentage points higher among females than males. The obesity rate ranged between 17.3 percent for white, non-Hispanics and 25.7 percent for black adults. When overweight and obesity were combined, the rates were similar for black and Hispanic adults (63.5 percent and 62.3 percent, respectively), but approximately 10 percentage points higher than the rate for white, non-Hispanic adults (52.5 percent).

Overall, the prevalence data indicate more variation among population groups in rates of overweight than in rates of obesity. Overweight rates ranged from 23.4 percent among women age 19-44 to 49.8 percent among men age 45-64. Obesity rates ranged from 14.3 percent among men 65 years of age and older to 29.8 percent among black women of all ages. Overweight and obesity rates combined reached 71.1 percent among men 45-64 years of age (data not shown).

Expenditure data are presented in Tables 3 and 4 on the following pages. Between 1996 and 2000, 8.5 percent of aggregate expenditures in the Southern region were attributable to overweight and obesity, which translated to $25.4 billion in 2003 dollars. The percentage of spending attributable to overweight and obesity varied among adult subgroups and reached 9.3 percent for men, 9.7 percent for adults age 45-64, 11.1 percent for Hispanics, 11.8 percent for blacks, 9.6 percent for the poor, and 9.6 percent for adults with no college degree (see Table 3).

The estimated per capita increase in medical spending attributable to overweight was 9.7 percent or $261 (inflated to 2003 dollars) overall and ranged between 8.3 percent ($480) for older adults and 12.0 percent ($140) for adults age 19-44. The estimated per capita increase in medical spending attributable to obesity was 30.3 percent, or $832 (inflated to 2003 dollars), overall and ranged between 27.8 percent ($1,622) for older adults and 36.6 percent ($417) for Asians (see Table 4).

Table 2. ***Prevalence of Each BMI Category Among Adults in the South by Population Group***

	Underweight	Normal	Overweight	Obese
Body Mass Index (BMI)	**<18.5**	**18.5-24.9**	**25.0-29.9**	**≥30.0**
Age:				
19-44	3.1%	46.4%	32.4%	18.1%
45-64	1.4%	36.9%	39.9%	21.8%
≥65	2.4%	42.3%	37.8%	17.4%
Gender:				
Male	0.8%	36.9%	44.2%	18.2%
Female	4.0%	48.2%	27.9%	20.0%
Race/Ethnicity:				
White	2.7%	44.8%	35.2%	17.3%
Black	1.8%	34.7%	37.8%	25.7%
Hispanic	0.9%	36.8%	39.5%	22.8%

Strengths and Limitations

The current research provided the first and only estimates of overweight- and obesity-related medical costs in the Southern region and used national and well-established data sets. There are several limitations to the study. First, the NHIS collects self-reported height and weight. To the extent that overweight and obese individuals under reported their weight, our prevalence and expenditure estimates would be conservative. Second, the results reflect only direct medical costs and do not include indirect costs that may be associated with obesity, such as decreased productivity or job absenteeism. Indirect costs of obesity are also significant, approaching the magnitude of the direct medical costs [27].

Third, our estimates represent only the amount of money that could have been saved had the overweight or obesity never existed. If a person moved from an obese BMI category to a normal BMI category, it is likely that they would have a different health profile than if they had never been obese. Therefore, we cannot conclude from this study that losing weight would save on medical costs. However, Oster et al. [18] estimated the health and economic benefits of weight loss in obese persons and concluded that a modest (10 percent) weight loss was associated with a decrease in medical costs attributed to obesity-related co-morbidities. Thus, although our results cannot be translated into potential cost savings, it is possible that weight reduction would be associated with decreased health care costs.

Fourth, although we pooled several years of data, the sample sizes by population subgroup were small. Thus, wide variation around the subgroup

estimates was expected. Standard errors were not calculated, because the purpose of the analysis was not to determine whether differences among the subgroups were statistically significant. In their national study, Finkelstein et al. [7] reported standard errors of 3.0 and 2.6 for percentage of total aggregate medical spending attributable to overweight and obesity, respectively.

Finally, our findings were based on a cross-sectional analysis of data and did not reflect the effect of BMI on mortality. Previous research had documented that obesity increased risk of death [1,2,4,8,15,20], while overweight was not associated with excess mortality [5,8,9], particularly in older age groups [10,11,14,21]. It is therefore possible that lifetime medical costs of obese individuals could be similar or even lower than those of normal weight individuals. Further investigation of the effects of the mortality gap on lifetime medical costs would be of interest.

Table 3. ***Overweight- and Obesity-Attributable Medical Expenditures and Fractions: Overall and by Population Group (MEPS 1996-2000)***

	Overweight BMI 25-29.9	**Obese** BMI ≥30	**Overweight and Obesity Combined**
Overall	3.1%	5.5%	8.5%
Expenditures (M$)	$9,120	$16,327	$25,447*
Age:			
19-44	3.4%	5.8%	9.2%
45-64	3.3%	6.4%	9.7%
≥65	2.7%	4.8%	7.4%
Gender:			
Male	3.6%	5.6%	9.3%
Female	2.7%	5.3%	8.0%
Race/Ethnicity:			
White	3.0%	4.9%	7.9%
Black	3.3%	8.5%	11.8%
Hispanic	3.7%	7.4%	11.1%
Asian	2.5%	1.1%	3.5%
Other	2.6%	7.2%	9.8%
Income:			
Poor	3.5%	6.1%	9.6%
Low	3.0%	5.8%	8.8%
Middle	2.9%	5.3%	8.2%
High	3.2%	5.1%	8.3%
Education:			
Less than college	3.2%	6.4%	9.6%
College degree	2.8%	5.2%	8.0%
Graduate degree	3.1%	5.3%	8.4%

*The expenditure estimate (inflated to 2003 dollars using the CPI Med.) for the Southern region was taken from Martin et al. [13].

Challenges and Opportunities

The prevalence data indicated that 54.9 percent of adults in the Southern region were overweight or obese from 1996 to 2000. Similar to black women nationally, black women in the South had the highest rate of obesity. Our results were also in agreement with those of Paeratakul et al. [19], who found that the rate of overweight was higher in men while the rate of obesity was higher in women.

Combined, overweight and obesity accounted for 8.5 percent of aggregate medical spending in the South between 1996 and 2000. This figure was similar to the national figures previously reported in the literature [1,7].

Obesity presents unique challenges to the Southern region of the United States. Rural communities may require the most basic of initiatives to determine their primary needs. Often, such needs have not been determined due to the possible lack of cohesion within a widespread community, limited representation within decision-making bodies and/or few political advocates. Limited resources and lack of access to available services often hinder effective service delivery in rural areas. Therefore, involving existing organizations such as local and state health departments is paramount. Equipping such organizations with resources to identify, educate and serve at-risk populations could promote positive change.

Policy and Program Implications

Prevalence of overweight and obesity continues to increase, and medical costs associated with weight-related co-morbidities will increase accordingly. Sturm et al. [23] estimated that disability rates would increase by 1 percent per year more in the 50-69 age group if current trends in obesity continued. Continued funding of public health programs addressing obesity prevention and treatment is needed and should be directed to those programs that prevent illness and premature deaths at little cost [12].

Specifically, our study findings should assist local, state and federal policymakers who decide on the distribution of limited resources to address the obesity epidemic. The results could be used to strengthen food and nutrition assistance programs aimed at low-income families. Those programs are the primary source of nutrition education for low-income families, and their role in the prevention of obesity is vital. For example, providing more educational materials in Spanish may be necessary in an area with an increased Spanish-speaking population. Also, more guidance could be provided to promote obesity prevention. A case management element could be added to increase accountability and support in meeting nutritional and health goals. These initiatives could spiral into community support groups or events promoting healthy living.

State and local health departments may use the information to develop obesity prevention programs targeting population groups that have the greatest prevalence of obesity. Lastly, community interventions to increase the ease of transforming education into action are vital. Local and state initiatives could fund the development or enhancement of recreation opportunities for young children,

Table 4. *Per Capita Increase in Medical Expenditures Attributable to Overweight and Obesity: Overall and by Population Group**

	Overweight		Obese	
	Spending Increase ($)	Percent Increase	Spending Increase ($)	Percent Increase
Overall	$261	9.7%	$832	30.3%
Age:				
19-44	$140	12.0%	$428	34.6%
45-64	$289	10.2%	$973	30.4%
≥65	$480	8.3%	$1,622	27.8%
Gender:				
Male	$224	9.8%	$727	32.5%
Female	$318	9.5%	$922	29.0%
Race/Ethnicity:				
White	$292	9.4%	$935	29.3%
Black	$182	10.3%	$652	32.6%
Hispanic	$171	10.7%	$556	33.4%
Asian	$126	11.9%	$417	36.6%
Other	$328	8.8%	$986	31.5%
Income:				
Poor	$342	10.5%	$1,153	35.4%
Low	$308	10.1%	$954	31.3%
Middle	$209	9.4%	$650	29.2%
High	$228	9.1%	$742	29.6%
Education:				
Less than college	$295	10.3%	$919	32.1%
College degree	$251	9.5%	$768	29.1%
Graduate degree	$234	9.7%	$730	30.3%

*Expenditures were inflated to 2003 dollars using the CPI Med.

Analysis of the means yields average expenditure estimates of $2,731, $2,966 and $3,853 for the normal weight, overweight and obese, respectively.

teens, families and older adults. Improving a local park with a walking trail, or building a basketball court near a local housing area would promote both physical health and opportunities for familial and community cohesion.

The system must be strengthened. Initiatives must be population and environment specific so as to increase the potential for success. Prevention strategies can be infused into existing programs, and various community leaders and organizations can collaborate in task forces to propose other meaningful interventions. The intensity of the obesity epidemic must be met with the same energy cultivated by the involvement, support and action of communities and policymakers alike.

Research Implications

Trends in obesity-related medical spending over time could be determined by comparing future spending estimates with baseline data from this study. The data are also critical for future studies to estimate the cost effectiveness of weight management programs and of other efforts to reduce the prevalence of obesity in this region. Cost effectiveness is an increasingly important criterion for allocating scarce resources. Essentially, more research regarding the weight-related disease burden, including the associated medical costs, is necessary to better inform decision makers at all levels who are engaged in policy and programmatic discussions.

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Acknowledgments

This research was funded by a grant from the USDA/Southern Rural Development Center. The contents do not necessarily reflect the view or policies of the USDA, nor does the mention of trade names, commercial products or organizations imply endorsement of the U.S. government. We thank Ian C. Fiebelkorn and Eric A. Finkelstein at RTI International in Research Triangle Park, N.C., for helping with the data analysis.

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