

OBESITY IN THE WORKFORCE: HEALTH EFFECTS AND HEALTHCARE COSTS

April 2007

HIGHLIGHTS

- Among American workers participating in corporate health and wellness assessments, obese workers had a substantially higher prevalence of metabolic, circulatory, musculoskeletal, and respiratory disorders.
- A strong correlation emerged between workers' body weight and mean self-reported blood pressure. The rate increased from 115/73 in individuals with normal weight to 128/80 in the most obese individuals (Body Mass Index (BMI) > 35.0).
- Moderately obese workers (BMI 30.0-34.9) incurred total annual healthcare costs 21% above those with normal weight.
- Severe obesity was associated with healthcare costs that were 75% higher than those with normal weight.

INTRODUCTION

The obesity epidemic in America has been widely documented. The Centers for Disease Control and Prevention estimate that 32% of adults in the United States are overweight and 34% are obese.¹ The terms overweight and obese used in this brief, as provided in Figure 1, are defined by the World Health Organization. Employers, who pay for most of the healthcare expenses for working-age Americans, are particularly concerned with the impact of obesity both on the cost of providing health benefits and on the productivity of their workforces.² To examine this problem, researchers from the Healthcare business of Thomson Reuters used data from a customer base of large, self-insured employers to investigate the relationship between being overweight/obese and both health status and healthcare costs.

METHODS

Data for this study came from the MarketScan[®] Health Risk Assessment (HRA) Database, which is comprised of linked health risk assessments and medical claims data from nine large employers who use the Medstat Advantage Suite[®] decision support system from Thomson Reuters. The study sample was comprised of all workers who reported their height and weight on an HRA during 2003-2005 and who were enrolled in the health benefit plan for all 12 months of the year in which they completed the HRA. The HRA database is characterized by both self-selection (voluntary participation in HRA programs) and self-reporting (employees complete questionnaires), so these data must be interpreted with caution. For the purpose of this analysis, we assumed that Body Mass Index (BMI), calculated by the HRA from self-reported weight and height, is directionally correct, in that any reporting bias up or down is independent of the true level of obesity.

¹Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association* 2006; 295:1549-1555.

²Institute on the Costs and Health Effects of Obesity. *Promoting Healthy Weight Through Healthy Lifestyles*. National Business Group on Health, 2004. http://www.businessgrouphealth.org/pdfs/obesity_final032204.pdf. Accessed April 16, 2007.



Workers were grouped by their BMI, calculated as the ratio of weight in kilograms to the square of height in meters. The World Health Organization (WHO) classification³ was used, combining Classes 2 and 3 as shown in Figure 1.

Figure 1: Study BMI Classifications

| Classification | Body Mass Index |
|--|-----------------|
| Underweight | < 18.5 |
| Normal Weight | 18.5 - 24.9 |
| Overweight | 25.0 - 29.9 |
| Class 1 Obesity (moderate obesity) | 30.0 - 34.9 |
| Class 2 and Class 3 Obesity (severe obesity) | 35.0 + |

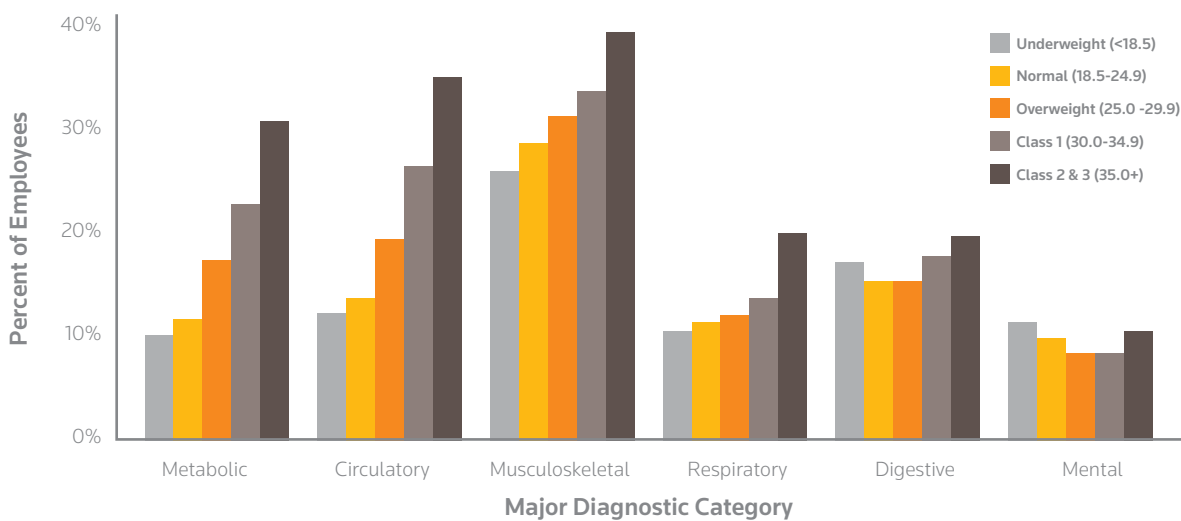
For discussion purposes, Class 1 is labeled *moderate obesity* and the combination of Class 2 and Class 3 is labeled *severe obesity*. Workers at each BMI level were compared on three sets of measures: 1) self-reported blood pressure, 2) diagnoses reported on health benefit claims, and 3) annual healthcare costs, including spending on inpatient, outpatient, and pharmacy services.

OBSERVATIONS

Obesity Is Associated with Multiple Health Problems

It is well established that obesity is a risk factor for metabolic and circulatory conditions such as diabetes, high blood pressure, and heart disease. In our study, the frequency of metabolic and circulatory conditions was three times higher in employees with severe obesity compared to normal-weight employees. In addition, increasing body weight was positively correlated with a higher prevalence of musculoskeletal conditions such as arthritis, back pain, and injuries such as fractures, sprains, and strains. The prevalence of respiratory conditions did not vary much across the range of BMI levels from underweight to overweight. However, the prevalence of these conditions increased with moderate obesity and was nearly twice as high among severely obese versus normal-weight workers. The prevalence of digestive conditions was moderately elevated in both underweight and obese workers.

Figure 2: Health Conditions Associated with Overweight and Obesity

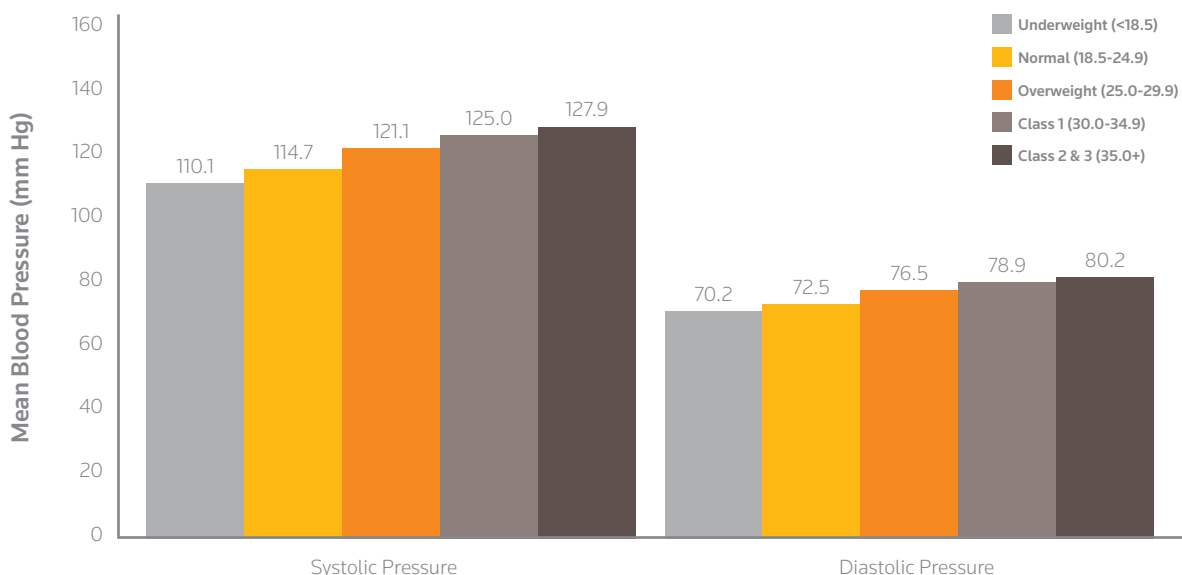


³WHO Consultation on Obesity. *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation*. WHO Technical Report Series, Number 894. http://whqlibdoc.who.int/trs/WHO_TRS_894.pdf. Accessed April 16, 2007.

Blood Pressure Rises with Increased Body Weight

The correlation between body weight and blood pressure has previously been documented. In our study, workers who reported higher body weights also reported higher blood pressures. Severe obesity was associated with a 13-point increase in systolic pressure and a 9-point increase in diastolic pressure, as compared with individuals of normal weight. The implication for cardiovascular risk has been examined in a previous study,⁴ which has estimated that for individuals 35-64 years of age, a 15-point increase in average systolic blood pressure would be associated with a 27% increase in the risk of cardiovascular events such as heart attack and stroke. In the same study, a 10-point increase in average systolic blood pressure – similar to that observed in the moderately obese group in our study – would be expected to increase cardiovascular risk by 18 percent. The observed correlation between increased body weight and increased blood pressure is therefore consistent with the previously noted higher prevalence of circulatory disorders in obese persons.

Figure 3: Relationship Between Body Mass Index and Blood Pressure

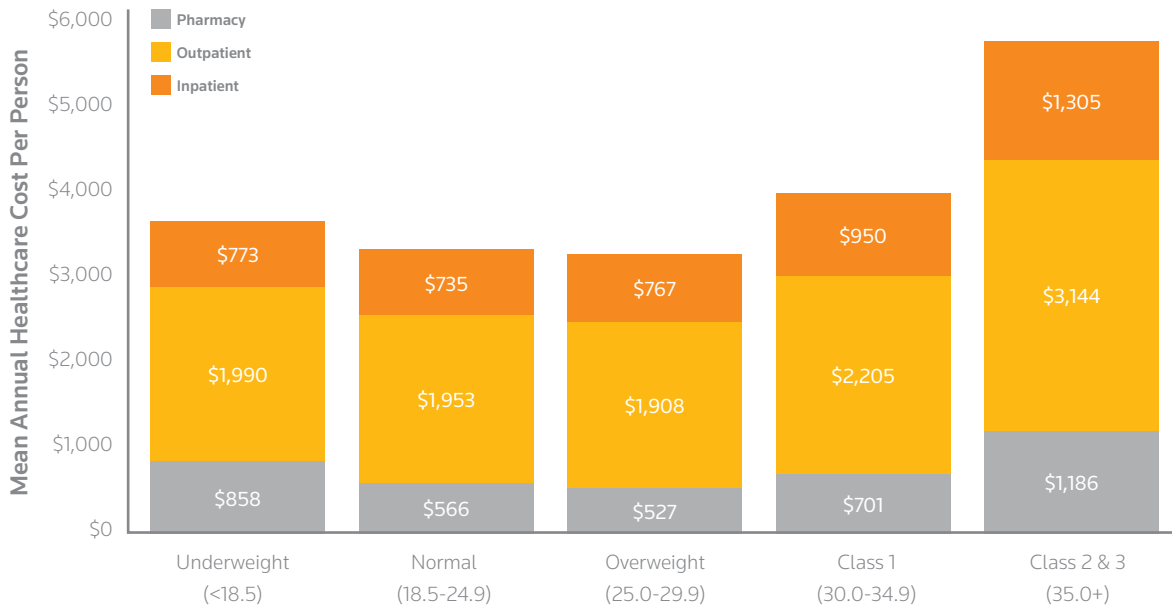


Healthcare Costs Increase with Body Weight

Given its multiple adverse health consequences, obesity has been implicated as a contributing factor in a sizable proportion of the total healthcare costs in the United States. In our sample of workers, total annual healthcare costs per person were similar for normal and overweight individuals (\$3,254 and \$3,201, respectively) and were elevated at either end of the weight scale. Moderate obesity (Class 1) was associated with a \$670 increase in costs (to \$3,925). Severe obesity (Classes 2 and 3) was associated with a \$2,441 increase (to \$5,695), as compared with costs for persons of normal weight. Underweight persons also incurred more costs than normal-weight individuals. Moderate and severe obesity were associated with 21% and 75% cost increases, respectively. Similar proportionate increases in costs were observed across inpatient, outpatient, and pharmacy services.

⁴Singh G, Miller JD, Huse DM, Pettitt D, D'Agostino R, Russell MW. Consequences of increased systolic blood pressure in patients with osteoarthritis and rheumatoid arthritis. *Journal of Rheumatology* 2003; 30:714-719.

Figure 4: Relationship Between Body Mass Index and Healthcare Costs



CONCLUSION

Health risk assessments offered by employers to their employees provide an opportunity to quantify the impact of known health risks – such as obesity – on disease prevalence in the workforce and the costs of providing health benefits. It is uncertain whether HRA participants are representative of the entire workforce and how accurately they report data such as height, weight, and blood pressure, but our study observed the expected correlations between increasing body weight and the prevalence of a range of health problems. Further research is needed to understand potential reporting biases and to assess the overall implications of these findings. Nonetheless, this investigation suggests that linking HRA and claims data may be an emerging resource for professionals in the fields of health services and health economics.

AUTHORS

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