

THE ASSOCIATION BETWEEN OBESITY AND PRODUCTIVITY LOSS

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INTRODUCTION

- The rising prevalence of obesity and associated comorbidities may be responsible for US annual medical expenditures of up to \$147 billion annually, with approximately half of that amount paid for by private insurers.¹
- Previous research also shows increasing rates of absenteeism associated with increasing BMI, with the greatest absenteeism among Obese III females (BMI 40+), who missed almost 1 week of work per year.¹
- There is little evidence in the literature on the magnitude of productivity losses resulting from excess weight, including both increased absenteeism (defined as missed work) and presenteeism (defined as reduced productivity while on the job).

OBJECTIVE

- To quantify the per capita and aggregate costs of productivity losses (absenteeism and presenteeism) stratified by BMI categories.

METHODS

- Sample**
- Data were obtained through the 2008 US National Health and Wellness Survey (NHWS).
 - NHWS is an annual cross-sectional study of disease status, healthcare attitudes, behaviors, and outcomes of adults (age 18+).
 - Data were collected through self-administered, internet-based questionnaires fielded to 63,000 US adults. The current study included respondents who were employed full time, non-pregnant, reported height and weight data (which was converted to BMI), and whose BMI levels were at least 18.5 (N = 24,140).
- Measures**
- Demographics
 - Respondents provided information on their age, gender, race/ethnicity, education, geographical region, household income, marital status, health insurance, and smoking behavior.
 - BMI
 - Respondents provided their height and weight, which was used to calculate their BMI and subsequently their BMI categories.
 - Normal: 18.5 – 24.99
 - Overweight: 25 – 29.99
 - Obese I: 30 – 34.99
 - Obese II: 35 – 39.99
 - Obese III: 40+
 - Work Productivity and Activity Impairment (WPAI) Questionnaire²
 - Absenteeism and presenteeism were assessed using the WPAI questionnaire.
 - Respondents reported the number of work hours missed in the past seven days due to their health (absenteeism).
 - Respondents also reported the degree to which their health affected their ability to function while at work in the past seven days (presenteeism).
 - Estimates ranged from 0 ("health problems have no effect on my work") to 10 ("health problems completely prevented me from working").
 - This rating was converted into a proportion and multiplied by the number of working hours in the past seven days to arrive at the number of hours missed due to impairment while at work.

- Statistical Analyses**
- Dichotomous weight variables (dummy variables) were created for the BMI categories with normal weight as the reference category. These variables were then entered into two negative binomial regressions to predict absenteeism and presenteeism, controlling for age, age squared, ethnicity, education, geographical region, household income, marital status, smoking behavior, and health insurance.
 - Absenteeism and presenteeism regression equations were used to predict the incremental hours of lost work for an overweight Obese I, Obese II, or Obese III respondent relative to a normal weight respondent with identical demographic characteristics.
 - Incremental hours of lost work were then converted into days (assuming 40 working hours per week and 50 working weeks per year) and subsequently monetized by estimating an hourly income based on each respondent's age and gender and median income level provided by the Bureau of Labor Statistics (BLS).³

REFERENCES

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- Reilly MC, Zbrozek AS, Dukes EM. 1993. The validity and reproducibility of a work productivity and activity impairment instrument. Pharmacoeconomics, 4(5): 353-365.
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RESULTS

- Of the full-time employed respondents, 70.5% were overweight or obese (complete demographic information presented in Table 1).

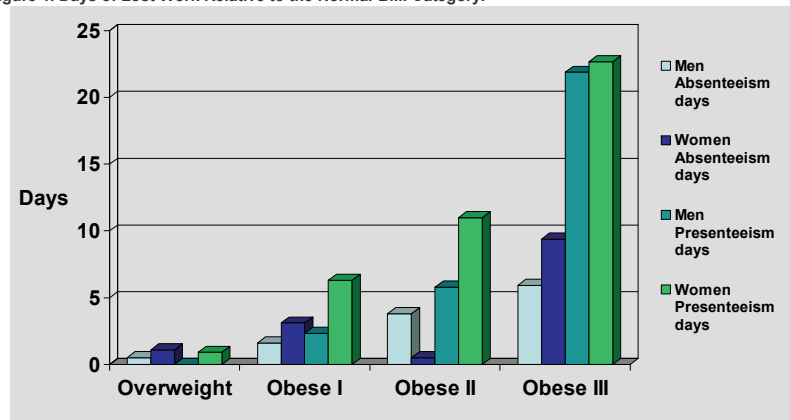
Table 1. Demographic Information for Full-Time Employed Sample.

NHWS (n = 24,140)					
Male (%) 57.5%		Age (Mean/SE) 42.0 (0.08)		Current Smoker (%) 23.8%	
BMI Categories		Race/Ethnicity		Household income	
Normal BMI (%)	29.5%	White (%)	69.2%	< \$25K (%)	7.7%
Overweight (%)	35.6%	Black (%)	12.7%	\$25K–\$49.9K (%)	30.0%
Obese I (%)	19.4%	Asian (%)	5.5%	\$50K–\$99.9K (%)	41.6%
Obese II (%)	8.9%	Hispanic (%)	9.6%	> \$100K (%)	17.0%
Obese III (%)	6.5%	Other (%)	3.0%	Decline to answer	3.7%
Education		Region of residence		Marital status	
Less than high school (%)	2.2%	Northeast (%)	20.1%	Single (%)	29.9%
High school diploma (%)	14.1%	South (%)	24.3%	Married (%)	57.0%
Some college (%)	39.5%	Midwest (%)	35.3%	Widowed (%)	1.8%
College degree (%)	44.2%	West (%)	20.3%	Divorced (%)	11.3%

Regression-Adjusted Results

- Those classified as overweight were not significantly different than those with normal BMI levels on measures of absenteeism or presenteeism for either males (0.5 more days of absenteeism and 3.3 less days of presenteeism) or females (1.1 more days of absenteeism and 0.9 more days of presenteeism) (Figure 1).
- Obese I males reported significantly higher levels of absenteeism (1.6 more days) and presenteeism (3.1 more days) than males with normal BMI. Obese I females also experienced significantly higher levels of absenteeism (3.1 more days) and presenteeism (6.3 more days) than females with normal levels of BMI (Figure 1).
- Levels of absenteeism were equivalent between Obese II females and normal weight females (0.5 more days), yet levels of presenteeism were significantly greater (11 more days). Males in the Obese II category, however, reported additional absenteeism (3.8 more days) and presenteeism (5.8 more days) compared to their normal weight counterparts (Figure 1).
- Obesity III individuals had significantly more productivity loss. Females in this category recorded the highest levels of absenteeism and presenteeism (9.4 and 22.7 more days, respectively, than normal weight females). Obese III males reported similar figures (5.9 and 21.9 more days, respectively) (Figure 1).

Figure 1. Days of Lost Work Relative to the Normal-BMI Category.



LIMITATIONS

- Since this study relied on self-reported data, any biases in reporting would bias the estimates of obesity and its related costs.
- Since the study only included full-time workers, the total economic impact of productivity losses from excess weight may be underestimated.

Regression-Adjusted Results (continued)

- Monetized incremental annual work productivity losses (Figure 2) were \$668 per Obese I male, \$1,667 per Obese II male, and \$4,818 per Obese III male. The monetized incremental work losses were \$1,250 per Obese I female, \$1,580 per Obese II female, and \$2,150 per Obese III female. Overall monetized work productivity losses are shown in Figure 3.

Figure 2. Monetized Absenteeism and Presenteeism Losses Relative to the Normal-BMI Category

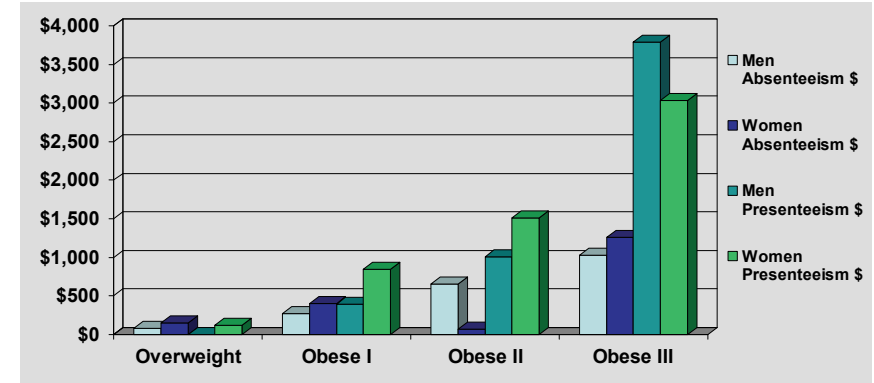
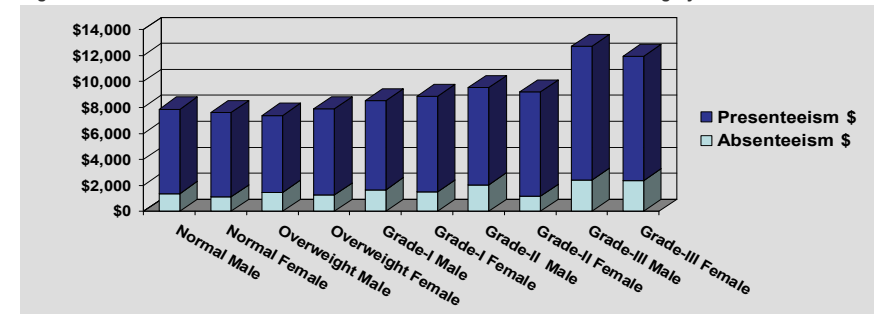


Figure 3. Total Monetized Absenteeism and Presenteeism Losses for Each BMI Category



- Although Obese III accounted for 19% of the obese sample (Figure 4), they accounted for over a third of obesity-related work productivity losses.

- Projected to the total US full-time employed population, work productivity losses due to obesity (Obese I through III) accounted for \$42.8 billion annually, \$12.8 billion for absenteeism (Figure 5) and \$30.0 billion for presenteeism (Figure 6).

Figure 4. Number of Obese I, Obese II, and Obese III Respondents.

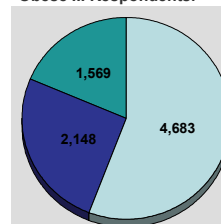


Figure 5. Absenteeism Costs (in Billions) of Obese BMI Categories.

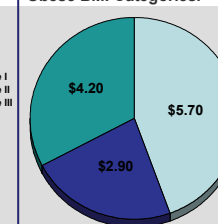
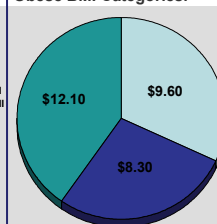


Figure 6. Presenteeism Costs (in Billions) of Obese BMI Categories.



DISCUSSION

- These results demonstrate the profound impact obesity has on both absenteeism and presenteeism. As BMI increases, even after controlling for a variety of confounders, respondents reported more productivity losses.
- Projecting our sample to the US population, annual work productivity losses were estimated to be \$42.8 billion.
- Given the high rates of presenteeism among the obese, cost-effectiveness analyses at the worksite level that do not incorporate these costs and the potential savings resulting from successful weight loss may result in inaccurate conclusions.