Introduction

It is no surprise to most people living in the United States that the prevalence of obesity has reached epidemic proportions. The Center for Disease Control (CDC) estimates that a third of the U.S. population is obese (see Exhibit 1).

Exhibit 1. Prevalence of obesity in the U.S. in 2010

In 2008, the medical costs associated with obesity were approximately 147 billion dollars. That same year, medical costs for obese individuals were $1,429, higher than for non-obese individuals.¹ A recent study indicates that by the year 2030, obese workers will cost employers 580 billion dollars a year in lost productivity and 210 billion dollars a year in medical costs.²

Obesity is defined as an elevated Body Mass Index (BMI). BMI is a simple index of weight-for-height. It is defined as the weight in kilograms divided by the square of the height in
meters (kg/m²). A BMI calculator can be found at the following website: http://www.nhlbi.nih.gov/guidelines/obesity/BMI/bmicalc.htm. According to the World Health Organization (WHO), “overweight” is defined as a BMI >25 and “obesity” is defined as a BMI ≥30.

The health implications of obesity are enormous. Obesity is associated with many serious and even life-threatening diseases such as:

- High blood pressure
- Diabetes
- Heart attack
- Stroke
- Arthritis
- Gallbladder disease
- Liver disease
- Dementia
- Obstructive sleep apnea
- Cancer (e.g., uterus, esophageal, kidney, breast, colon)
- Elevated risk for anesthesia, surgery, pregnancy, infection, and wound healing

**Obesity and Increased Risk at Work**

**Fatigue/Sleepiness**

Obesity is associated with an increased risk of Obstructive Sleep Apnea (OSA). OSA is caused by repetitive airway obstruction manifested by loud snoring and pauses in breathing. Undiagnosed and untreated OSA leads to excessive daytime sleepiness (EDS). The risk of OSA increases when the BMI is > 35 and when the neck circumference is greater than 17 inches in males and 16 inches in females. A sleep study is the “gold standard” for diagnosing OSA, but this test is somewhat inconvenient and expensive. More limited and less expensive sleep studies that can be performed in an individual’s home can also be useful as a screening tool for OSA. Once diagnosed, OSA can be effectively treated using a continuous positive airway pressure (CPAP) machine. Other treatment options include weight loss, surgery, or oral appliances.

Excessive daytime sleepiness has a profound effect on safety at work. Negative impacts of EDS include:

- Falling asleep during critical tasks
- Poor performance in critical work situations
- Impaired decision making and problem solving
- Delayed reaction time
- Diminished vigilance to tasks
- Impaired judgment
- Decreased ability to perform complex tasks
- Impaired memory
- Reduced communication
- Negative mood
Although safety sensitive jobs across many different industries are adversely affected by EDS, the transportation industry is especially hard hit by driver fatigue. There are 14 million commercial drivers in the U.S. with 341,000 crashes per year, at a cost of 48 billion dollars annually. There are 4,000 deaths per year from these crashes, and, in 31% of these deaths, fatigue is considered to be a major cause. The prevalence of OSA in commercial drivers is estimated to be approximately 17% to 28%.

The National Transportation Safety Board (NTSB) has urged the Federal Motor Carrier Safety Administration (FMCSA) to implement screening for commercial drivers for OSA. The FMCSA published proposed guidelines for OSA screening in the Federal Register but Congress has not yet passed OSA screening regulations. The Federal Aviation Administration (FAA), after a number of high-profile, fatigue-related aviation incidents, announced in 2013 that all pilots and air traffic controllers would be screened for OSA as part of their periodic medical evaluations.

Current screening criteria for OSA can be highly effective in identifying individuals with undiagnosed OSA. In a study by Parks, et al., in 2009, 53 out of 456 commercial drivers who met the screening criteria for OSA were referred for sleep studies. Of these 53 drivers, 20 complied with the recommendation for a sleep study. Of the 20 drivers who had a sleep study, 100% of them were confirmed to have OSA. In another study by Berger, et al., in 2012, 5,908 out of 19,371 commercial drivers screened positive for OSA using an online questionnaire. Of the 5,908 drivers with positive OSA screenings, 2,103 had sleep studies and 68% were diagnosed with significant OSA.

**Heat Stress**
Heat-related illness runs the gamut from minor to life-threatening illness and includes heat rash, heat cramps, heat exhaustion, heat syncope (fainting), and heat stroke. Obesity is a major risk factor for heat-related illness and is fatal 3.5 times more often in obese individuals than in normal-weight workers. Obese workers are more vulnerable to heat stress for the following reasons:

- Obesity reduces the ability of the body to dissipate heat
- Obesity increases the stress on the cardiovascular system
- Excessive skin folds promote heat rash
- Obesity reduces the rate of heat adaptation (acclimatization)
- Obesity-related medical conditions (such as diabetes and high blood pressure) further increase the risk of heat related illness

**Falls**
Obese workers are more likely to fall at work. In a study by Fjeldstad, et al., in 2008, older obese adults fell almost twice as often as normal weight adults (27% vs. 15%). Finkelstein, et al., in 2007, showed that older obese adults who fell were 15% to 79% more likely to have an injury that required medical attention. At a CDC/NIOSH conference on fall prevention and protection in 2010, a laboratory study by Jian Liu, Ph.D., showed that obese adults were at higher risk for slip initiation than normal-weight individuals. Liu demonstrated that obese adults required 17.5% more friction on floor surfaces to prevent slip initiation.
Confined Spaces
Obese workers are at increased risk for sudden incapacitation while working in confined spaces. This is due to the increased risk from obesity-related illnesses such as diabetes (low blood sugar reaction from insulin), heart attack, stroke, or heat-related illness. It can be very difficult to extricate an obese worker from a confined space, and may subject rescuers to an increased risk of injury while trying to save their coworker.

Hand-arm Vibration Syndrome and Carpal Tunnel Syndrome
Hand-Arm Vibration Syndrome (HAVS) was previously known as Vibration White Finger. It results from prolonged exposure to vibrating tools. It is manifested as numbness, tingling, pain, cold sensitivity, and loss of function in the hands. Obesity may increase the risk for developing this painful and potentially disabling condition.

Carpal Tunnel Syndrome (CTS) occurs when the median nerve is compressed as it travels from the forearm to the hand through a narrow (carpal) tunnel in the wrist. CTS is three times more common in women than men. When the median nerve is compressed, it causes numbness, tingling, pain, and weakness in the hand. Obesity is a well documented risk factor for CTS.10

Personal Protective Equipment
It can be challenging for companies to provide appropriate personal protective equipment (PPE) for overweight employees for the following reasons:

- PPE may not be readily available in very large sizes
- PPE may be worn less frequently by obese employees due to comfort issues
- Obese drivers may use seatbelts less frequently due to comfort, and are more prone to fatal traffic accidents
- Ergonomics of the obese employee’s workspace may be a poor fit
- Fall protection equipment is only rated to 310 pounds

Obese employees who wear fall protection harnesses are at increased medical risk if they are suspended after an arrested fall. In addition, rescue time could be prolonged due to their size. Coworkers attempting to rescue an obese individual are at increased risk of injury.

Obesity and Increased Workers’ Compensation Costs
Many studies have documented the increased workers’ compensation (WC) costs associated with obese workers. Ostbye, et al., in 2007 studied 11,728 healthcare and university employees. Workers with normal BMI had 5.8 WC claims per 100 full-time equivalents. Obese workers had 11.7 WC claims per 100 full-time equivalents. Medical claims costs were $7,503 vs. $51,091 for obese workers, and indemnity claims costs were $5,396 vs. $59,178 for obese workers.11

An NCCI Research Brief in 2010 studied over 4,500 WC claims that had obesity as a secondary diagnosis. “Obese” claims costs were 3-5 times “non-obese” claims costs over a 12- to 60-month period.12

Pollack, et al., in 2007 studied 7,690 workers at a U.S. manufacturing company; 85 percent were overweight or obese. Overweight and obese workers had twice the risk of having a
work-related injury than normal weight workers. Injuries of the back, shoulder, leg, or knee were especially common.¹³

**Workplace Strategies for Prevention of Obesity**

The benefits of workplace programs that reduce obesity go well beyond enhancing safety and reducing WC costs. Other benefits include:

- Reduced absenteeism
- Reduced presenteeism
- Reduced medical costs
- Reduced STD/LTD costs
- Improved worker satisfaction, morale, and engagement
- Decreased employee turnover
- Demonstrating employer concern for workers
- Providing opportunities for socialization and support

Planning an obesity prevention program in the workplace requires commitment from senior management. The company must provide adequate resources and funding. Employees should be involved in all aspects of planning the program. Programs should be offered at convenient times and locations and must offer sufficient variety to meet diverse employee needs. Companies should consider providing incentives for participation or penalties for non-participation. The effectiveness of the program components should be periodically assessed in order to determine which ones are working, and which ones need improvement.

Health plan benefits design can incentivize healthy behavior. Benefits incentives might include:

- Lower health insurance premiums for employees who complete an on-line health risk appraisal (HRA) questionnaire and a health coaching session
- Reimbursing employees for a consultation with a dietician
- Providing incentives for employees who exercise regularly
- Providing subsidies or enrollment stipends for health club memberships
- Providing subsidies for participation in approved weight loss programs

Companies can create a healthy work environment in several ways:

- Provide on-site measurement of BMI and scales for employees to check their weight periodically
- Provide healthy food choices in the cafeteria and vending machines
- Provide healthy food choices for meetings and company events
- Provide ongoing health coaching for employees who want to lose weight
- Provide onsite nutritional counseling or weight loss programs
- Provide educational classes, workshops, lectures, and online information for employees who want to lose weight
- Create contests and competitions to encourage weight loss (e.g., “Biggest Loser”)

Conclusions

Obesity has reached epidemic proportions in the United States and is associated with many adverse health outcomes. Obesity also negatively affects safety in the workplace by increasing the risk from excessive fatigue and sleepiness, heat-related illnesses, slips and falls, confined space entry, hand-arm vibration syndrome, carpal tunnel syndrome, and difficulties with use of personal protective equipment. In addition, costs for workers’ compensation injuries, non-work related medical expenses, and short-term and long-term disability expenses are all increased for obese employees. Companies can create programs to prevent obesity in the workplace through benefit design and by creating a healthy work environment.

Bibliography


Federal Register, Vol. 77, No. 77, Friday, April 20, 2012; Notices, pages 23794-23797.


