Obesity in the Workplace

Weighing the Associated Risks

from Research to Reality

LIBERTY MUTUAL RESEARCH INSTITUTE FOR SAFETY

SCIENTIFIC UPDATE

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RESEARCH INSTITUTE FOR SAFETY
Dear Readers

Since the 1960s, the number of U.S. adults whose body mass index (BMI) falls into the obese range has more than doubled. Although the word obesity is typically thought to imply extreme weight, in truth, clinical obesity (defined as BMI > 30) is not always readily apparent. Whether perceptible or not, the fact that obesity increases the risk of health issues such as hypertension, type 2 diabetes, and heart disease is fairly well established.

This issue of Scientific Update focuses on obesity in the context of work-related injury and return to work. While research in these areas is relatively new, it is an important first step toward increasing employer awareness of concomitant issues and identifying potential ways of addressing them. We hope the initial findings from our research are informative and that the article on employer-based wellness programs provides tangible strategies for promoting health and wellness at work.

We invite you to read more about these developments and as always, we welcome your feedback.

Ian Noy, Ph.D.
Vice President and Director
Obesity is a public health concern affecting populations in Europe, North America and, increasingly, in developing countries. In the U.S., the prevalence of adult obesity more than doubled between 1980 and 2010. Today, more than one third of the nation’s adults have a body mass index (BMI) of 30 or greater, meeting the clinical definition of obesity. Studies show that a BMI greater than 30 significantly increases risks for certain health conditions including hypertension, type 2 diabetes, and heart disease. These risks are prompting increased national attention to this issue in the form of awareness campaigns and public health programs.

Although obesity is primarily a matter of public health, it also has workplace implications. “Obesity is a well-established trend in both the general population and the employed population,” explains Theodore Courtney, MS, CSP, director of the Liberty Mutual Research Institute for Safety’s Center for Injury Epidemiology (CIE). “It is important to understand where this population health trend leads in terms of overall health and safety, and to reflect on what businesses can do to help address the situation.”

According to a 2008 report, U.S. employers spend more than $200 billion annually on account of obesity-related health conditions.1 “Employers bear a large share of employee healthcare and disability costs, so anything that impacts people’s health is important to them,” says Courtney, who maintains that employers are increasingly looking for ways to address weight-related health concerns that extend beyond traditional insurance-based health maintenance programs. In some cases, companies are taking an active role in their employees’ health by establishing workplace programs that promote health and fitness.

To better understand how obesity impacts the workplace, the Liberty Mutual Research Institute for Safety has initiated research in this area. Most recently, the Institute’s CIE conducted a study to determine whether obesity is associated with on-the-job injury risk (see p. 4). This study is one of the first to look at this question from a broad, industry-wide perspective. Other studies include an investigation of the impact of BMI and sleep duration on injury risk (see p. 5) and a study of how BMI affects low back pain recovery and return to work (see p. 6).

These studies aim to improve understanding and awareness of the impact of obesity in the workplace and help to provide strategic research direction. “A better understanding of obesity and its workplace implications can help employers find ways to respond to this growing health concern,” asserts Courtney. “Employer response to the obesity issue can potentially benefit both the organization itself, as well as the individual employees in terms of better health and longevity.”

Does Obesity Contribute to Work-Related Injury?  
The CIE Investigates

Many scientific studies have shown a clear link between obesity and an increased risk of cardiovascular diseases, type 2 diabetes, and other adverse health conditions. Some studies have also suggested that obesity may be a risk factor for work-related injury. On the whole, however, early studies examining the association between obesity and workplace injury have produced inconclusive results.

In 2007, researchers from Johns Hopkins Bloomberg School of Public Health published a review of the scientific literature for studies on obesity and the risk of non-fatal occupational injuries. The resulting paper, entitled “Obesity and workplace traumatic injury: Does the science support the link?” (Injury Prevention, Vol. 13, pp. 297–302, 2007) concluded that, although obese employees were slightly more likely to be injured than non-obese employees, many of the estimates produced by the studies were not statistically significant. The authors cited a need for more robust research on the topic. “Studies are needed that use large diverse samples, advanced statistical methods, and control for potential confounders,” noted the review.

The Research Institute’s Center for Injury Epidemiology (CIE) has set out to meet this need. Most recently, CIE researchers used nationally representative survey data to evaluate the association between obesity and work-related injury, following the same individuals over time. Another epidemiological study looked at cross-sectional national data to explore the potential influence of a person’s body mass index (BMI) and sleep duration on the odds of him/her having a work-related injury. Each of these studies provided new insights to better inform researchers and businesses on the scope and impact of obesity in the workplace.

Assessing Obesity and Work-Related Injury Risk

To more accurately assess the relationship between obesity and work-related injuries, CIE Research Scientist Tin-Chi Lin, Ph.D., examined data from the National Longitudinal Survey of Youth (NLSY79) using robust statistical methods. “The NLSY79 is a longitudinal cohort survey. In other words, it follows a representative set of individuals over time, collecting data from these same individuals annually or semi-annually,” explains Dr. Lin. For the study, CIE researchers analyzed the 12-year subset of NLSY79 data containing a workplace injury module (1988–2000).

Researchers hypothesized that obesity contributes to work-related injury. “We know that, in general, excessive weight gain can result in health issues that can affect human performance. Therefore, we hypothesized that obesity would have an association with work-related injury,” says Dr. Lin, the study’s principal investigator. “Prior studies of obesity and workplace risk focused on a single industry, and the results may not be generalizable to the entire workforce. To address this issue, our study drew from data representing the entire U.S. workforce,” explains Dr. Lin.

Researchers applied logistic regression models to analyze the NLSY79 dataset. Obesity was measured as BMI (defined

1. The National Longitudinal Survey of Youth 1979 (NLSY79) is a nationally representative sample of 12,686 men and women who were between 14 and 21 years of age when they were first surveyed in 1979. This cohort has been surveyed annually since their enrollment, and changes over time tracked by the NLSY. Although a primary focus of the NLSY79 survey is labor force behavior, the survey’s content is considerably broader, allowing other research topics to be explored.
The study findings…indicated that obesity was associated with a 25 percent higher risk of work-related injury, independent of all other relevant factors, such as age, work hours, and occupational hazards.

as weight divided by the square of height, or kg/m²) and was based on self-reported height and weight. In accordance with the U.S. Centers for Disease Control criteria, a BMI of 18.4 or less was considered underweight; 18.5 to 24.9 was regarded as healthy weight; 25.0 to 29.9 was considered overweight, and 30 or greater was considered obese.

The study findings, published in the Scandinavian Journal of Work, Environment, and Health (Vol. 39, No. 3, pp. 268–275, 2013) indicated that obesity was associated with a 25 percent higher risk of work-related injury, independent of all other relevant factors, such as age, work hours, and occupational hazards. In their introductory remarks to the issue, the journal’s editors noted that the study provided “compelling evidence” that obesity increases the risk of occupational injuries.

Estimated Risk of Work-Related Injury by Workers’ Weight Category

<table>
<thead>
<tr>
<th>Weight Category</th>
<th>Odds Ratio</th>
</tr>
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<tbody>
<tr>
<td>Underweight</td>
<td>0.2</td>
</tr>
<tr>
<td>Normal=Referent</td>
<td>1.0</td>
</tr>
<tr>
<td>Overweight</td>
<td>1.2</td>
</tr>
<tr>
<td>Obese</td>
<td>1.4</td>
</tr>
</tbody>
</table>

“Although we found obesity to be associated with increased odds of occupational injury (see chart above), more research is needed to identify the mechanisms by which excessive body weight contributes to workplace injury, how obesity interacts with other occupational hazards, and which of these interactions may increase work-related injury risk,” notes Dr. Lin. He adds, “The more we can inform employers about these underlying injury mechanisms, the better they will be able to help reduce high BMI-related injuries.”

Effects of BMI and Sleep Duration on Injury Risk

As part of other Institute efforts to understand the impact of sleep and work patterns on safety, CIE researchers examined how sleep duration and BMI affect injury risk. “In the literature, shorter sleep durations and higher BMIs have generally been associated with increased work-related injury risk; however, we did not know whether these two risk factors acted independently as risk factors or if they were they interactive, with one factor modifying the effect of the other,” explains CIE Principal Research Scientist, David Lombardi, Ph.D.

To address this question, researchers examined seven years of pooled data (2004–2010) from the U.S. National Health Interview Survey (an annual survey that captures the injury experience of a representative sample of U.S. workers). The dataset included information on both sleep duration and BMI from more than 100,000 employed adult male and female participants. The study team estimated annualized work-related injury rates across three BMI categories: healthy weight, overweight, and obese, as well as usual daily sleep duration (<6, 6–6.99, 7–7.99, 8–8.99, and ≥9 hours). Researchers then examined the interaction between daily sleep duration and BMI, while controlling for weekly working hours, age, gender, race/ethnicity, education, type of pay (hourly vs. salaried), industry, and occupation.

The study’s findings, published in Chronobiology International (Vol. 29, No. 5, pp. 556–564, 2012), showed no significant work-injury risk resulting from the interaction between usual daily sleep duration and BMI. Rather, these two variables proved to be independent risk factors for a work-related injury. In regards to BMI, the adjusted injury risk was 1.34 times higher for the obese category compared with the healthy-weight category. Overweight people were at greater risk, but not to a statistically significant degree. (See chart p. 6)

These results suggest that reduced sleep contributes to increases in work-related injury risk, regardless of a worker’s body mass; and obesity increases work-injury risk, regardless of usual daily sleep duration. “Both sleep duration and BMI were shown to have a significant independent effect on injury risk,” notes Dr. Lombardi, the study’s principal investigator. “The good news is that both sleep and weight are potentially modifiable risk factors for injury, but it is important to recognize that, when both risk factors are present, each needs to

(Continued on next page)
be addressed. You can’t just correct one, and assume that all the risk will disappear.”

“To date we have conducted two nationally representative studies using different population data sets. Both studies have shown that obesity significantly elevates the risk of injury when controlling for other factors,” recaps CIE Director, Theodore Courtney, MS, CSP. Recognizing that future research is needed to identify the specific mechanisms that drive this association, Courtney notes that the current findings do support the need for action to help reduce obesity-related risk. “While we don’t yet have definitive answers, workplace strategies that help foster healthy choices with respect to diet and exercise certainly can’t hurt,” concludes Courtney.

In 2012, the Center for Disability Research (CDR) studied the association between body mass index (BMI) and low back pain recovery and return to work. With collaborators at the Harvard School of Public Health, CDR researchers looked at how BMI affected pain reduction, resumption of daily function, and return to work among 607 patients (197 female, 410 male) seeking treatment for acute low back pain at one of eight occupational health clinics. “Several recent publications had shown higher workers compensation cost and disability duration for workers with elevated BMI, so we wanted to find out whether this effect could be observed in short-term recovery from work-related acute low back pain,” explains William Shaw, Ph.D., the study’s principal investigator.

At the first clinic visit, participants completed a self-assessment survey with questions on psychosocial and workplace disability risk factors, as well as basic health and demographic information. Follow-up questionnaires at one and three months after the reported date of injury provided researchers with further information on changes in pain intensity, functional limitation, work status, and use of clinic- or home-based therapies during the post-injury period.

For the data analysis, researchers categorized participants into one of three categories: healthy weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9), or obese (BMI ≥30). They estimated the effects of BMI on low back pain recovery by comparing the groups’ follow-up outcome measures, and calculated the main effects with and without controlling for possible confounding factors (such as age, income). Initial pain intensity, age, and BMI were modeled as continuous variables in tests of possible interactions.

The findings, published in the Journal of Occupational and Environmental Medicine (Vol. 54, No. 2, pp. 192–197, 2012), showed no significant differences in pain outcomes, functional limitation, or return to work as a function of BMI.

“Some other studies have shown that high BMI may be a risk factor for more severe workplace injuries or more expensive claims. In this study, obesity did not appear to be a useful prognostic factor,” states Dr. Shaw, adding that the discrepancy may arise from the fact that this study focused on uncomplicated cases of low back pain, only during the acute stage of injury, and among younger-than-average participants (mean age = 36). “Although BMI is a contributory factor to workers compensation costs overall, it does not appear to impede the ability of younger, blue-collar workers to recover from acute low back pain in the early stages of a workers compensation claim,” he explains. “These findings suggest that the effect of obesity on disability is moderated by other factors.”
Living a healthy lifestyle is not a part-time venture. How then, can full-time workers—especially those who struggle with weight issues—maintain healthy habits at work? Lori Adams, RN, industry director for Liberty Mutual’s Risk Quality Assessment Department, believes that today it is more important than ever for employers to support wellness in the workplace. “With rising health care costs, growing numbers of older workers, and the increasingly sedentary nature of many modern-day jobs, helping employees stay healthy on the job can have significant benefits. It’s good for workers, but it’s also good business practice,” notes Adams.

Over the years, Adams has worked closely with employers to help reduce workplace risk. Through her risk control experiences, Adams has learned the importance of recognizing the employee as a whole person with a life that extends beyond the workday. “The person who comes to a job and works eight hours is the same person when at home. So if someone is struggling with health issues, that impacts both work and home life.” For that reason, maintains Adams, the individual worker’s wellness and job safety are inextricably linked.

“In many cases, people really want to improve their health by adopting healthier eating habits and by exercising more. It is important for employers to support these kinds of activities,” says Adams. In recent years, employers have increasingly adopted programs to help workers stay or get healthy. Adams notes that some larger companies began implementing in-house fitness centers during the 1980s and 1990s. While acknowledging this to be a positive move in the right direction, Adams contends that this may not be the best approach to helping the majority of employees improve exercise habits. “In most cases, those employees who would use an on-site fitness center are already exercising. That doesn’t mean it’s not a good idea, but the employer has to be realistic. Many people are not going to be comfortable exercising in front of their co-workers,” she says, noting that on-site fitness centers also fail to address the health of the growing numbers of remote workers.

“Wellness in the Workplace (Continued on next page)
Another way employers have begun to motivate employees towards more healthy lifestyles is to hire outside firms to perform employee well-being assessments. These optional assessments, often offered by corporate health plan providers, allow firms to gather and analyze individual data to find areas where individual employees might be at risk, such as diet, activity, smoking, or stress. The firms then generate a report with helpful health advice, resources, and follow-up measures. “Sometimes firms even recommend and provide individual health coaching to help at-risk employees meet health goals,” notes Adams.

While subsidized weight loss programs and well-being assessment firms may not be possible for all companies, there are a variety of low-cost programs that any company, large or small, could implement to encourage wellness in the workplace. “One company I worked with set up a ‘Walking to Vegas’ competition. The goal was to see which team could walk as many miles as it would take to walk to Las Vegas. This kind of friendly competitive fun can really motivate people to get consistent exercise. Nearly anyone can participate, and it can help get heart rates up and bring weight down,” says Adams. Other low-cost activities might include periodic company-driven communications (such as e-mails, webposts) promoting health and healthy living, nutrition and exercise tips, and even brief sessions on how to read and evaluate food labels.

“Programs that promote healthy habits can be a win-win for employers and their employees, but no single program is going to work for everyone. Different strategies are going to work for different companies and different options are going to attract different people. So you have to offer a variety of things. What’s important is to find ways to inspire people to live more healthy lifestyles, at home and at work,” concludes Adams.

Did you know?

More than 1000 occupational safety and health professionals responded to a recent National Safety Survey conducted by Environment Health and Safety (EHS) Today (August 2013). Among 15 recommended workplace safety and health improvements, survey takers called for the addition of a holistic worksite wellness program that overlaps with the home and family.

The survey also captured information on what companies are currently offering in terms of wellness initiatives (see table, right).

Does your organization offer any of the following wellness initiatives?

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A formal workplace wellness program</td>
<td>65.1%</td>
</tr>
<tr>
<td>On-site medical checkups</td>
<td>40.8%</td>
</tr>
<tr>
<td>A gym or fitness facility</td>
<td>40.3%</td>
</tr>
<tr>
<td>Healthy on-site food options</td>
<td>34.2%</td>
</tr>
<tr>
<td>Nutrition education</td>
<td>40.3%</td>
</tr>
<tr>
<td>Weight-loss competitions</td>
<td>43.2%</td>
</tr>
<tr>
<td>Wellness incentives</td>
<td>56.8%</td>
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</tbody>
</table>

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Telephone: 1-508-497-0211
E-mail: researchinstitute@libertymutual.com