UIC UNIVERSITY OF ILLINOIS AT CHICAGO Center for Employee Health Studies
SCHOOL OF PUBLIC HEALTH

Stress in the Workplace

A Policy Synthesis on Its Dimensions and Prevalence

The Center for Employee Health Studies

Jonathan C. Dopkeen, PhD

Renee DuBois

© University of Illinois, March, 2014

Table of Contents

Executive Summary **3**

Introduction/Background **5**

Results **6**

National Overview **6**

Rates and Prevalence of Injury, Illness, and Days Away from Work 6

Worker Characteristics 7

Types of Injuries 8

Stress as Both a Primary and Contributing Factor **9**

Rates and Prevalence of Depression, Anxiety, and PTSD 10

Use of Psychotropic Drugs, Impact on Occupational Injury 14

Policy and Management Implications **16**

References: **20**

Authors:

Jonathan C. Dopkeen, PhD is the Director of the Center for Employee Health Studies and a Clinical Assistant Professor in the Division of Policy and Administration at the UIC School of Public Health.

Renee DuBois is a Research Assistant in the Center for Employee Health Studies, and an MPH candidate in the Division of Health Policy and Administration at the UIC School of Public Health.

Contact: Jonathan C. Dopkeen, PhD, Clinical Assistant Professor and Director, Center for Employee Health Studies, Health Policy and Administration MC 923, Room 783, 1603 West Taylor Street, Chicago, Illinois 60612. (312) 413-1951, jdopkeen@uic.edu, Center website: http://cehs.publichealth.uic.edu

Executive Summary

The economic burden of occupational injury and illness in the U.S. is staggering. Employers spend $310 billion annually on direct and indirect costs related to occupational injury and illness (Leigh, 2011; OSHA, 2014). As large as that is, the annual direct and indirect costs of treating mental health disorders[1] are even greater ($317.5 billion), (Kessler RC, 2008; Centers for Disease Control and Prevention, 2011).

The extent that these costs overlap is currently unknown and warrants further research. Stress, depression, and anxiety are repeatedly ranked as three of the top five causes of absenteeism in the workplace, and employers lose an additional $70 billion each year on lost productivity and increased absenteeism due to untreated or ineffectively treated mental health disorders (Surgeon General, 1999).

This paper considers the prevalence and demographics of stress in the US, the relationship of stress disorders to other health conditions, to functional impairment and accidents, and to occupational injuries and illness. Psychological distress has been shown to increase the risk of occupational injury by 34% (Kim, 2008). We can develop estimates of *acknowledged* stress related occupational events (whether through workers' compensation or workplace violence), but we do not know the incidence or value of physical injuries in the workplace that have their etiology in stress.

The rates of stress, mental health disorders and occupational injury vary between demographic groups, whether by age, sex, ethnicity and even military service. Despite the fact that men have a higher incidence rate of injury, women report higher stress levels. While PTSD is most frequently associated with veterans, approximately 3.5% of American adults in the civilian population suffer with PTSD in any given year (NIMH, 2013). Women are twice as likely to be affected as men; the lifetime prevalence of PTSD among men is 3.6% and is 9.5% among women. There are differences even among veterans, where attention has been brought to the increased prevalence of PTSD in soldiers returning home from war. National Guard/Reservists are returning in greater numbers to their pre-deployment employers, and studies cited here show that the National Guard/Reserve population is at increased risk of PTSD and other mental health problems relative to regular active-duty service members (Shea, 2010; Milliken, 2007).

Stress emerges as a primary and contributing factor in occupational injury and illness. Injury rates are 2 to 6 times higher among individuals with a mental illness than in the overall population (CDC, 2011). One key driver of those rates is the use of psychotropic drugs that multiple studies have linked to occupational injury. Those seeking treatment for any of the mental health disorders discussed here generally receive a combination of psychotherapy and pharmaceutical treatment. Common medications to treat depression, anxiety, and PTSD include, but are not limited to, antidepressants (Paxil, Zoloft) and anti-anxiety medications called benzodiazepines (Xanax, Valium, Klonipin, Ativan, Ambien). Benzodiazepines (BZs) and opioids (Hydrocodone, Oxycodone) are among the top 30 most frequently prescribed medications.

[1] We define a *mental health disorder* as a mental health condition that affects your mood, thinking or behavior, i.e. depression, anxiety disorders, schizophrenia, eating disorders or addictive behaviors. The terms *mental health disorder*, *mental disorder*, and *mental illness* are used interchangeably in this document.

Multiple studies cited in this paper establish that benzodiazepines impair cognitive functioning and performance while driving (Oster, Huse, Adams, Imbimbo, & Russell, 1990), and affect psychomotor simple and complex reaction times, speed perception, steering, decision-making and tracking (Leung, 2011). The likelihood of accidents and emergency outpatient care were significantly greater in the 6 months following initiation of therapy, rising to 3.7 times as likely with use beyond six months. Another study found users were 4 times more likely than non-users to be in a traffic accident within a month after initial prescription, and twice as likely in the first week (Moden, 2011).

Similar findings are established for SSRI (Paxil, Zoloft) and tricyclic antidepressants (Amitriptyline). A U.K. study (Wadsworth, Moss, Simpson, & Smith, 2005) found that 9% of the workers studied used psychotropic medications in the past year, with antidepressants being the most common. Users of these medications were significantly more likely to be in a work and non-work-related accident. A Swedish study (Moden, Ohlsson, & Rosvall, 2011) associated these medications with a higher incidence of falling accidents and transportation accidents, in all age groups and both sexes.

The strength of the relationship of stress to occupational injuries and illness is compelling. But what can be done about it? Despite the evidence, we have yet to develop comprehensive health policy and intervention strategies to reduce stress-associated occupational injury. The nation and its employers need to consider these factors. As an initial framework, we recommend that the discussion begin with these three areas:

1. **Organizational change:** Employers must assess and address their organizational cultures. Strategies that can mediate workplace stress include developing managers who support their employees, maximizing employee autonomy, promoting engagement in the value of employees' work in alignment the with organization's mission, and improving the work environment.

2. **Screening and outreach:** Screening and supportive services should be considered for high-risk individuals, particularly following a major traumatic event or cumulative exposure. Employers must focus on those individuals who currently or in the past have displayed high risk factors.

3. **Managing the risk of prescription drugs that impair performance:** Employers must provide outreach and assessments to individuals who are manifesting sustained dependence of certain categories of legal prescription drugs. Alternative work situations should be developed for a short period for employees who self-identify as using or initiating prescription medications of certain drug classes. Efforts should be made to steer at-risk employees to less impairing prescriptions. When legal drug testing is conducted, it should test for legal prescription drugs of these classes.

Stress in the workplace is a public health issue. It needs to be addressed and proactively managed as a population-based problem. These recommendations may raise ethical and even legal issues as intrusive on privacy. Privacy is a sacred value, but so are public health rights to safety and protection. Prescription drugs for mental health conditions ranging from depression and anxiety to mild sleep disorders have proliferated. Under the Affordable Care Act, mental health treatment has achieved parity with other medical benefits. The costs of stress in the American workplace are huge, with incidence and prevalence rates that are shockingly high. Management of this epidemic merits public debate.

Introduction/Background

Occupational injuries are detrimental not only to individual workers, but also to organizations, and performance outcomes. The Bureau of Labor Statistics (2013) reported more than 3.7 million nonfatal occupational injury and illness cases in the United States in 2012, more than half of which required days away from work, job transfer, or restriction. While there are a wide range of both primary injury types and contributing factors, the role of stress in the workplace has been repeatedly identified as having a growing impact on the development of occupational injury and illness.

The economic burden of occupational injury and illness in the U.S. is staggering. Collectively, costs associated with occupational injury and mental health disorders exceed the costs to treat cancer, diabetes, and chronic obstructive pulmonary disease combined. Employers spend $310 billion annually on direct and indirect costs related to occupational injury and illness (Leigh, 2011; OSHA, 2014). Direct costs ($67 billion) include the price of medical care (physicians, hospitals, medication), and indirect costs ($183 billion) include costs related to the effects of the injury or illness (overtime, replacement and training). Compounding these expenditures, OSHA (2014) estimates that companies lose an additional $60 billion annually on decreased productivity as a result of occupational injury and illness.

The cost to treat mental health disorders exceeds the cost to treat occupational injury and illness. However, the extent that these costs overlap is currently unknown and warrants further research. Annual direct treatment costs associated with mental health disorders have recently been estimated at over $100 billion, with indirect costs of $217.5 billion (Kessler RC, 2008; Centers for Disease Control and Prevention, 2011). Stress, depression, and anxiety are repeatedly ranked as three of the top five causes of absenteeism in the workplace, and employers lose an additional $70 billion each year on lost productivity and increased absenteeism due to untreated or ineffectively treated mental health disorders (Surgeon General, 1999).

Due to its multi-dimensional influence on both physical and mental health, psychological distress has been shown to increase the risk of occupational injury by 34% (Kim, 2008). This paper considers depression, anxiety, and post-traumatic stress disorder (PTSD) specifically as dimensions of stress. Yet, despite the evidence that stress and mental health disorders like depression, anxiety and PTSD have a direct impact on an organization's occupational injury rate, there remains a lack of comprehensive intervention and health policy strategies to address how to reduce the prevalence of stress-associated injury. This literature review will: (1) synthesize and discuss the current

knowledge base, (2) identify key risk factors in the development of occupational stress, (3) demonstrate the ways in which stress influences occupational injury, and (4) discuss implications for organizational change strategies and health policy.

Results

National Overview

This section presents an overview of the relationship between stress and occupational injury within the United States. Results from several national data reports and a wide variety of research studies will be discussed, which specifically highlight key findings across industries and demographics.

Rates and Prevalence of Injury, Illness, and Days Away from Work

In 2012, there were more than 3.7 million nonfatal occupational injury and illness cases in the U.S., representing a total incidence rate of 3.7 cases per 100 FTE (full-time equivalent worker) (Bureau of Labor Statistics, 2013). However, the incidence rate in the public sector (5.6 per 100 FTE) is 65% higher than the private sector (3.4 cases per 100). More than half of the private sector cases required days away from work, job transfer, or restriction, at a rate of 1.8 cases per 100 FTE (BLS, 2013b). This figure is 33% higher in the public sector (2.4 cases per 100 FTE). Increased rates of injury in the public sector can be largely attributed to considerably higher rates of injury in the transportation, warehousing, and healthcare industries.

In 2012, the average incidence rate for cases requiring days away from work[2] was 1.1 per 100 FTE, with a median of 9 days away from work. Regardless of industry sector, transit and intercity bus drivers consistently suffer the highest incidence rate of injury or illness that require days away from work, at 8.51 cases per 100 FTE and a median of 19 days away from work. This is 674% higher than the average incidence rate. Other occupations that suffer from high incidence rates of injury or illness requiring days away from work include police and sheriffs patrol officers (5.7), correctional officers and jailers (4.6), firefighters (4.4), nursing assistants (4.3), and emergency medical technicians and paramedics (4.2).

As seen at the occupation-specific level, those who work in the following industries are the most susceptible to increased rates of occupational injury and illness: protective services, transportation and material moving, building grounds cleaning and maintenance, and healthcare.

[2] This figure does not include cases that required job transfer or restriction.

Due to the nature of the work, these occupational groups are particularly demanding – both emotionally and physically. As a result, these groups continuously incur the highest rates of injury and illness, the highest cases of musculoskeletal disorders, and the highest levels of stress and mental health issues.

Worker Characteristics

The rates of stress, mental health disorders, and occupational injury vary between demographic groups. This research examined a number of different worker characteristics: age, gender, ethnicity, and length of employment. Several patterns emerged from this analysis, with potentially meaningful implications.

Age: Workers in the 45-54 age group consistently experience the highest incidence rates of occupational injury or illness that require days away from work, exceeding any other group (1.2 per 100 FTE), and had a median of 11 days away from work. This finding is particularly important, because this age group also experiences the highest rates of both depression and anxiety. Studies describe this group as a high-risk category for either occupational injuries or mental health disorders; none acknowledge that this age group repeatedly emerges as high risk in both categories. This particular age group is not the focus of this article, but this finding has important organizational and policy implications and warrants further research.

Gender: The incidence rate of days away from work cases was higher in men (1.2 per 100 FTE) as compared to women (1.0 per 100 FTE). Men required a median of 10 days away from work, while women required a median of 7 days.

Despite the fact that men have a higher incidence rate of injury, women report higher stress levels. More women report experiencing extreme stress than men; 23% of women report their stress level at an 8, 9 or 10 on a 10-point scale, compared to 16% of men (American Psychological Association, 2013). And while depression was more common in women, approximately 35% of men and 22% of women with depression reported that their symptoms made it very or extremely difficult for them to work, get things done at home, or get along with other people (Pratt & Brody, 2008).

Race or ethnicity: White workers accounted for 39% of the cases in 2012, Hispanic or Latino workers accounted for 12% of the cases, and black or African American workers accounted for 8%

of the cases.[3] Unfortunately, the Bureau of Labor Statistics only reports the percentage total cases, and does not report incidence rate for each ethnicity. The absence of this data makes it impossible to compare incidence and prevalence of occupational injury and illness between ethnicities. However, research indicates that depression was more common in Non-Hispanic black persons than non-Hispanic white persons (Pratt & Brody, 2008) while anxiety is more prevalent in white, non-Hispanic populations.

Length of employment. As seen in ethnicity reporting, length of employment is only reported using the percentage of total cases, again making it difficult to compare incidence rates. However, workers with fewer than 12 months of employment accounted for 25% of the occupational injury or illness cases that required days away from work.

In 2012, the number of cases requiring days away from work increased by 5% in workers with 3 to 11 months of service. However, this was significantly higher in the retail trade occupational group, which experienced an 18% increase (BLS, 2013b). This elevated rate in retail trade occupations may be due to several factors. According to the (Centers for Disease Control and Prevention, 2013) retail trade workers and transportation/utility workers are at the highest risk of poor mental health. Furthermore, retail trade occupations have dominated post-recession job growth; new employees may be entering these positions following a recent layoff or stressful period of unemployment, and perhaps may not have received an appropriate level of training. These compounding factors certainly contribute to this dramatic increase, and warrant further investigation.

Types of Injuries

Musculoskeletal disorder (MSD) cases accounted for 34% of all injury and illness cases requiring days away from work (BLS, 2013b). Given the elevated incidence rate in the transit and intercity bus driver occupation, it is not surprising to see that they also have the highest incidence rate of all MSD cases, at 3.0 cases per 100 FTE with a median of 27 days away from work. Other occupations that suffer from high rates of MSD cases are emergency medical technicians and paramedics (2.6) and nursing assistants (2.3).

[3] Race was unreported in 39% of the cases, and the remaining 2% of cases were for the following races: Asian, Native Hawaiian or Pacific Islander only, American Indian or Alaska Native only, Hispanic or Latino and another race, or multi-race.

Stress as Both a Primary and Contributing Factor

There is a widespread understanding that high amounts of stress are unhealthy. Despite the various financial, physical, and behavioral implications, Americans struggle with mitigating the levels of stress in their lives, and consistently report that their personal stress levels are higher than what they believe to be healthy. For example, in a national survey conducted by the American Psychological Association (2013), approximately 20% of adults report that their stress level is extreme or high – an 8, 9 or 10 on a 10-point scale, and approximately 36% of workers typically feel stressed out during the workday (American Psychological Association, 2013; Centers for Disease Control and Prevention, 2013).

As a result, stress emerges as a primary and contributing factor in occupational injury and illness. Injury rates are 2 to 6 times higher among individuals with a mental illness than in the overall population (Centers for Disease Control and Prevention, 2011). Stress is known to increase perception of pain in an injury, delay return to work, and increase rates of recurrence (Kim, 2008). One survey of nurses highlights this delay in the return to work phenomenon; 30% of nurses who were on long-term sick leave reported stressful personal clashes with co-workers as the main cause of their absence (McVicar, 2003). It has been repeatedly found that individuals with depressive symptoms have decreased work productivity and increased absenteeism. In fact, an estimated 60% of workers report loss of productivity due to stress while at work (Health Advocate, 2009).

If untreated, consistently high stress can become a chronic condition, which can result in or exacerbate mental health conditions as well as chronic physical conditions like cardiovascular disease, cancer, diabetes, obesity, hypertension, asthma, muscle pain, or a weakened immune system. These conditions not only diminish the well-being of workers and increase the employer's health benefits expense, they contribute to injury incidence rates and outcomes. Consistently high levels of stress increase the risk of occupational injury. In a study of light/short haul truckers, a group that experiences high rates of injury and mental health issues, frequent stress increased the odds of occupational injury by 350% (Friswell & Williamson, 2010).

High levels of stress are also associated with substantial increases in health service utilization. Healthcare costs are nearly 50% greater for workers reporting high levels of stress. This rose to nearly 150% for workers reporting high levels of job stress *and* depression (Centers for Disease Control and Prevention, 2013). As we continue to explore the manifestations of stress in the workplace, it is critical that we develop appropriate organizational and policy solutions to these challenges.

The American Psychological Association (2008), rates the Top Five Workplace Stressors as low salary, lack of opportunity, too heavy a workload, unrealistic job expectations, and long hours. This list of stressors is not surprising; most everyone perceives that they work too many hours for not enough pay. However, as presented, this list does not provide much of an opportunity for change within most organizations.

Instead, if employers are interested in decreasing stress and stress-related occupational injury, it is critical that they consider *modifiable* factors that relate to organizational culture. These factors illuminate a more in-depth understanding of the nature of stress and create new opportunities for potential strategies and solutions. Results from a variety of research studies indicate that there are four primary organizational factors that influence the development of occupational stress: organizational and social support, autonomy, engagement, and a changing work environment. The paper highlights these factors as opportunities for managing the problem.

Rates and Prevalence of Depression, Anxiety, and PTSD

Over 25% of all adults in the United States currently have a mental illness, and nearly half will develop at least one mental illness during their lifetime (Centers for Disease Control and Prevention, 2011; National Institute of Mental Health, 2013). The most common mental illnesses in adults are mood disorders, like depression, and anxiety. The effects of mental illness range from minor disruptions in daily functioning to incapacitating personal, social, and occupational impairments (Centers for Disease Control and Prevention, 2011).

Mental illnesses, particularly depression, account for more disability than any other group of illnesses, including cancer and heart disease (Centers for Disease Control and Prevention, 2011; National Institute of Mental Health, 2013). Despite the strong connection between behavior and disease prevention, only 10% of Americans describe their healthcare as focused on behavior or lifestyle modifications that can positively impact their health, and only 22% of Americans say that their healthcare provider supports them in managing their stress (American Psychological Association, 2013).

Depression

Depression is a common and debilitating illness, and is characterized by changes in mood, attitude, sleep patterns, appetite, and energy level. Depression causes impairment in many areas of functioning, particularly in school, family, social life, and work. Nearly 80% of people with

depression report that their symptoms interfere with their ability to work, maintain a home, and be socially active; 27% report serious difficulties in both work and home life (Pratt & Brody, 2008).

Approximately 21 million American adults, or 9% of the U.S. adult population have depression in any given year (National Institute of Mental Health, 2013). Chronic, mild depression affects approximately 2% of American adults each year. Rates of depression are increasing in the U.S.; data collected in national studies from 1991 – 2008 indicate that rates of depression have increased 175% during that time period (Compton, 2006; CDC, 2011). Approximately 16% of the U.S. population have a lifetime diagnosis of depression (Centers for Disease Control and Prevention, 2011). Depression is associated with increased health care costs, higher rates of chronic medical conditions (Pratt & Brody, 2008) and often co-occurs with anxiety disorders and substance abuse. Approximately 50–60% of individuals with depression report a lifetime history of one or more anxiety disorders (Kaufman, 2000; Sekula, 2003).

Depression is treatable, and treatment enables people to return to the level of functioning they had before becoming depressed (Pratt & Brody, 2008). Despite the availability of treatment, most people with depression do not receive even minimally adequate care, and have not been in contact with a mental health professional in the past year. Only 15.6% of those with mild depressive symptoms saw a mental health professional, and only 24.3% of those with moderate symptoms received treatment. While the rates of contact with a mental health provider increased as symptoms worsened, only 39% of those with severe depression saw a mental health professional (Pratt & Brody, 2008).

Anxiety

Anxiety disorders include generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder, and phobias. While there are many overlapping symptoms between depression and anxiety, anxiety disorders are characterized by persistent and excessive worry.

Approximately 40 million Americans, or about 18% of adults have one or more anxiety disorders in any given year (Anxiety and Depression Association of America, 2014b) and more than half of those are categorized as serious or moderate. Generalized anxiety disorder is its own clinical diagnosis and affects 3.1% of the U.S. population, in any given year (Anxiety and Depression Association of America, 2014). Collectively, over 28% of the U.S. population has a lifetime diagnosis of one or more anxiety disorders (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005).

Anxiety disorders rarely exist in isolation and are highly correlated with one another. Anxiety and depression closely parallel each other and have overlapping symptoms. Close to 90% of individuals with anxiety disorders have a lifetime history of other psychiatric problems, and up to 96% of patients with depressive symptoms also have symptoms of anxiety (Kaufman, 2000; Sekula, 2003). This comorbidity is associated with greater symptom severity and persistence, more severe role impairment, higher incidence of suicidality, and requires more health care resources. Anxiety disorders cost the U.S. more than $42 billion a year, almost one-third of the country's $148 billion total mental health bill (Greenberg, et al., 1999).

While anxiety is treatable, the rates at which those with anxiety seek treatment from mental health professionals are low. Only one-third of those with anxiety receive treatment, which is consistent with trends seen in the treatment of depression (Anxiety and Depression Association of America, 2014b; Centers for Disease Control and Prevention, 2011).

Post-Traumatic Stress Disorder (PTSD)

While PTSD is most frequently associated with veterans, approximately 3.5% of American adults in the civilian population suffer with PTSD in any given year (National Institute of Mental Health, 2013). PTSD is a debilitating condition that can occur after exposure to a single terrifying event or from repeated exposure to threatening or traumatic events. These types of events include: violent personal assaults, childhood physical abuse or neglect, mugging, disasters, accidents, being attacked with a weapon, or military combat (MacFarlane & Bryant, 2007). A common symptom for those suffering with PTSD is the re-experiencing of the traumatic event in the form of flashback episodes, memories, nightmares, or frightening thoughts, especially when they are exposed to events or objects reminiscent of the trauma (Office of Disability Employment Policy, 2014).

PTSD frequently co-exists with other disorders such as depression and substance abuse, and is shown to influence increased rates of marital conflict and divorce, job loss, unemployment, arrests, and incarcerations (Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). Other anxiety disorders develop with PTSD in approximately 45% of patients (MacDonald, Colotla, Flamer, & Karlinsky, 2003).

Women are twice as likely to be affected as men; the lifetime prevalence of PTSD among men is 3.6% and is 9.5% among women. Due to frequent exposure to traumatic events as a part of their occupation, groups such as emergency personnel, firefighters, police officers, paramedics, and nurses are at increased risk of developing PTSD (Matusko, 2013; MacFarlane, 2007). Research indicates that 7-22% of emergency personnel developed PTSD, and 70-80% of nurses who are

physically assaulted will develop one or more symptom of PTSD (MacDonald, Colotla, Flamer, & Karlinsky, 2003). In industrial occupations, 25-50% of those who suffer a hand injury will develop PTSD (Weis, Grunert, & Christianson, 2012). These occupational groups should not be overlooked when discussing increased risk factors and strategies for change.

Nevertheless, the prevalence of PTSD in the veteran population is much higher than in the civilian population, and is estimated to be 12-18% in post-deployment populations (Litz & Schlenger, 2009). PTSD considered the most common psychiatric illness in Veterans (Belsher, Tiet, Garvert, & Rosen, 2012). The estimated lifetime prevalence rates of PTSD in war veterans is high: Vietnam (30%), Gulf War (12%), and 14% for veterans of Iraq or Afghanistan; this rate is expected to grow as new cases are identified in the coming years (Belsher, Tiet, Garvert, & Rosen, 2012). The number of veterans seeking and receiving PTSD-related compensation has jumped from over 10,000 veterans in 1999 to over 437,000 veterans at the end of 2010 (Belsher, Tiet, Garvert, & Rosen, 2012).

As with the other mental health illnesses discussed, post-traumatic stress disorder is treatable. However, only 50% of those with PTSD are receiving treatment, and 42% of those currently receiving treatment are receiving only minimally adequate care (National Institute of Mental Health, 2013). Military service members with PTSD symptoms seek care at about the same rate as the civilian population, and, just as in the civilian population, as many as many as 50% were not receiving treatment (RAND Center for Military Health Policy Research, 2008).

PTSD in the Returning National Guard / Reserve Population

As of 2013, approximately 2.5 million U.S. troops have deployed as part of Operation Enduring Freedom (Afghanistan) or Operation Iraqi Freedom (Iraq) (Adams, 2013). The pace of the deployment in these conflicts is unprecedented. With a higher proportion of the armed forces being deployed, deployments are longer, redeployment is common, and breaks between deployments are infrequent. At the same time, advances in both medical technology and body armor mean that more service members are surviving experiences that would have led to death in prior wars (RAND Center for Military Health Policy Research, 2008).

Of those deployed, more than a third were deployed more than once. As of 2012 nearly 37,000 American soldiers had been deployed more than five times, among them 10,000 members of the National Guard or Reserve units. Records also show that 400,000 service members have done three or more deployments (Adams, 2013).

As of 2008, the military reserve population was 1.1 million, with approximately 10% in active-duty service (Lane, Hourani, Bray, & Williams, 2012). The National Guard and Reserves comprise 38% of the deployed army in current wars and 28% of all deployed military personnel (Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). In contrast, less than 1% of troops in Vietnam were National Guard or Reserves.

Over the past several years, much attention has been brought to the increased prevalence of PTSD in soldiers returning home from war. However, many studies now show that the National Guard/Reserve populations are at increased risk of PTSD and other mental health problems relative to regular active-duty service members (Shea, 2010; Milliken, 2007). In a survey of recently returned military service members, over 42% of National Guard/Reserve service members returning from Operation Iraqi Freedom reported symptoms that require mental health treatment, this is more than double the rate reported by active duty service members (Lane, Hourani, Bray, & Williams, 2012). As these trends continue to emerge, further research on the mental health of National Guard / Reserve population is needed.

This increased prevalence of mental health disorders in the National Guard / Reserve population is largely due to the unique sources of stress faced by this group of soldiers (Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). These stressors include: interruption of jobs and careers, lack of prior military experience, expectation of long separations from family, and less support for the families at home. This is of particular importance for organizations that employ soldiers in the National Guard and Reserves. These individuals are returning to their previous places of employment at much higher levels of stress that before their deployments, and are experiencing significantly increased rates of mental health issues. It is not the intent of this article to dissuade organizations from employing military service members. Instead, employers need to be prepared to provide adequate resources to aid in their successful transitions back to civilian life.

Use of Psychotropic Drugs, Impact on Occupational Injury

When those affected by any of the mental health disorders discussed in this article seek treatment, they generally receive a combination of psychotherapy and pharmaceutical treatment. Common medications to treat depression, anxiety, and PTSD include, but are not limited to, antidepressants (Paxil, Zoloft) and anti-anxiety medications called benzodiazepines (Xanax, Valium, Klonipin, Ativan, Ambien). Benzodiazepines (BZs) and opioids (Hydrocodone, Oxycodone) are among the top 30 most frequently prescribed medications (Leung, 2011).

Benzodiazepines have long been proven to impair cognitive functioning and performance while driving (Oster, Huse, Adams, Imbimbo, & Russell, 1990). Depending on dosage, they affect psychomotor simple and complex reaction times, speed perception, steering, decision-making and tracking (Leung, 2011). During six-month period following initiation of therapy, BZ users were significantly more likely than non-users to require accident-related care, and twice as likely to have an accident-related emergency outpatient visit (Oster, Huse, Adams, Imbimbo, & Russell, 1990). Those who used BZs over a 6-month period were 3.7 times more likely to have an accident-related emergency outpatient visit. This is of particular importance in the workplace, especially considering that transportation and healthcare occupations have the highest rates of occupational injury and stress-related mental health disorders.

However, relative to studies on the use of alcohol and illicit drugs, there is very little written about the specific role of psychotropic medications and their impact on occupational injury. Only a few comprehensive studies have been published on this issue, and none of them were in the United States. An expert panel with the Federal Motor Carrier Safety Administration (2006) a division of the U.S. Department of Transportation, noted that the paucity of data precluded it from drawing an evidence-based conclusion regarding whether there is a relationship between the legal use of psychotropic medications and motor vehicle crash risk. However, they recommended that further consideration be given to the issue. And, while not required, commercial drivers may be asked to inform employer of any therapeutic drug use (Federal Motor Carrier Safety Administration, 2001).

Studies indicate that there is a direct link between psychotropic drug use and occupational injury. In a U.K. study (Wadsworth, Moss, Simpson, & Smith, 2005), 9% of the workers studied used psychotropic medications in the past year, with antidepressants being the most commonly prescribed medications. Usage of SSRI anti-depressants (Paxil, Zoloft) and benzodiazepines were associated with accidents inside and outside work, as well cognitive failures. Usage of Tricyclic Antidepressants (Amitriptyline) was associated with work and non-work accidents. The authors concluded that those taking an SSRI or tricyclic antidepressant, or benzodiazepine, were significantly more likely to be in a work and non-work-related accidents. In higher risk industries, such as construction or public transportation, the consequences of slower reaction time or difficulty recalling information are very serious.

A study conducted in Sweden (Moden, Ohlsson, & Rosvall, 2011) followed a population of over 935,000 individuals to assess the relationship of injuries and accidents to psychotropic medication use. In this study, the use of psychotropic medications was associated with a higher incidence of falling accidents and transportation accidents, in all age groups and both sexes.

Benzodiazepine users were 4 times more likely than non-users to be in a traffic accident within month after initial prescription. They also discovered that there is at least a double risk of road traffic accident within the first 7 days of benzodiazepine use.

Drug Testing after Accidents

As soon as possible after an accident involving a commercial vehicle, employers must test for alcohol and controlled substances (Federal Motor Carrier Safety Administration, 2001). Certain antidepressants and all benzodiazepines are controlled substances. If an accident occurs, a "10 panel urine screen" is generally used and can test for a variety of prescription medication and illegal drugs. However, employers are only required to test for marijuana, cocaine, opiates, amphetamines, and phencyclidine (PCP). (Federal Motor Carrier Safety Administration, 2001). More studies are needed to ascertain and better understand the extent to which employers test for antidepressants and benzodiazepines after occupational accidents.

Policy and Management Implications

The strength of the relationship of stress to occupational injuries and illness is compelling. How employers are going to approach this problem is even more significant. Stress in all its forms, and whether it can be managed, is an invisible issue that will drain financial resources, undermine the quality of human resources and diminish the competitiveness of American private and public organizations. This research synthesis demonstrates not only the prevalence of stress related conditions, their demographics, co-morbidities and costs, including the escalating expense of group health benefits; it also identifies stress as a contributing factor to physical injuries as a completely unmanaged risk.

Periods of disability due to job stress tend to be much longer than disability periods for other occupational injuries and illnesses (Centers for Disease Control and Prevention, 2013). However, that duration is associated with identified stress claims; the dimensions and frequency of physical occupational injuries for which the etiology is stress are just beginning to emerge.

Stress is repeatedly identified as one of the many factors that can influence occupational injury (Julià, Catalina-Romero, Calvo-Bonacho, & Benavides, 2013). A variety of studies show that there is an increase in the risk of suffering an occupational injury due to the following stress factors: working hours, time pressure, high levels of stress at work, high demands, low social support, ambiguity of roles, low decision latitude, low skill discretion, monotonous work, interpersonal conflicts at work, a highly variable workload, or insecurity of job future.

But what can be done about it? This research suggests interventions and policies that may be difficult but will open avenues to develop strategies by which the nation's employers can manage. As an initial framework, we recommend that the discussion begin with three areas: *organizational change*, *screening and outreach*, and *managing the risk of prescription drugs that impair performance*. More specifically, the elements in these strategies should include the following:

1. **Employers must assess and address their respective organizational cultures.** This requires a serious commitment from the top-down to create and reinforce a positive culture where management reinforces the values of well-being, health, safety, and engagement. Strategies that can mediate workplace stress include:
    a. **Develop managers who support their employees:** Continuous development of leadership skills in supervisors, emphasizing interpersonal skills, support, and psychological safety can positively moderate the relationship between the work environment and teamwork. There is a significant association between lack of organizational support and occupational injury (Julià, Catalina-Romero, Calvo-Bonacho, & Benavides, 2013), and support from supervisors is consistently associated with decreased levels of workplace stress, decreased turnover intent, improved worker safety, and fewer on-the-job injuries. For example, nursing assistants whose supervisors exhibited positive leadership qualities were significantly less likely to report workplace injuries or injury-related absenteeism (McCaughey, McGhan, Walsh, Rathert, & Belue, 2013).
    b. **Maximize employee autonomy:** Work processes should be reevaluated and training implemented that invests more latitude in the decision-making by an individual employee. Increased autonomy improves well-being and reduces absenteeism and injury (McCaughey, 2013; Quick, 2011).
    c. **Promote engagement in the value of employees' work and alignment with the organization's mission:** Engagement is consistently associated with employee commitment. Prior research indicates that employee engagement is related to individual and organizational outcomes such as job satisfaction, organizational commitment, and turnover intentions (McCaughey, McGhan, Walsh, Rathert, & Belue, 2013).

d. **Improve the work environment:** At the broad level, employees are stressed about job loss, added work due to downsizing, chronic workforce shortages, and a dependence on temporary and contractor-supplied labor (McCaughey, McGhan, Walsh, Rathert, & Belue, 2013). More narrowly, employers should improve the stability, reliability, and fairness in more immediate factors – such as scheduling – by reviewing constant shift change, working nights, and performance metrics that rely on unfavorable reviews (Vecchio, Scuffham, Hilton, & Whiteford, 2010).

2. **Screening should be considered for high-risk individuals, particularly following a major traumatic event or cumulative exposure**, such as in the emergency services. While psychological debriefing has no demonstrated benefit, the benefits of early intervention necessitate ready access to evidence-based treatments that have minimum barriers to care. Employers should be aware that distress may present indirectly in a similar way as conflict with management, poor performance and poor general health (MacFarlane & Bryant, 2007).

3. **Employers must focus on those individuals who have displayed high risk factors** and use the current evidence to ensure that these individuals are monitored and offered the opportunity for mental health assistance (MacFarlane, 2007). Other suggestions for assisting individuals perceived to have elevated risks include rotation of duties, morale improvement, and education before the exposure event occurs to normalize stress responses (Rose, 2006).

4. **Employers must consider outreach and assessments to individuals manifesting sustained dependence of certain categories of legal prescription drugs.** These would be drugs that may physically or psychologically impair decision-making, physical response time, attentiveness, mood or wakefulness. This can be done through third-party vendors who maintain HIPAA business associate and privacy arrangements, such as Employee Assistance and Disease Management vendors.

5. **Alternative work situations for a short period should be developed in order to have employees who self-identify as using or beginning legal pharmaceuticals of certain classes**, in order to minimize the risk of injury to themselves or others. That period should be defined in compliance with the pharmaceutical advisory instructions or longer if determined by other occupationally relevant research studies (e.g., drivers and other motor vehicle operators).

Risk Managers have been developing alternative or modified work programs to support employees returning to work from workers' compensation or short-term disability, why not create programs that keep these employees working safely?

6. **Efforts should be made to channel employees to less impairing prescriptions**. The effort should be to move employees at risk to the safest drugs that have the least demonstrated potential for impairment over the appropriate period, even if that is a chronic sustained pain medication. An employee's specific medical requirement for an impairing prescription related to his/her primary occupational function on an on-going basis could be cause for transfer to an alternative position.

7. **When legal drug testing is conducted it should include testing for legal prescription drugs of these classes**. By practice, the testing is generally conducted for illicit, controlled substances. Testing for prescription drugs is permissible in a number of states, but generally neglected because employers are not yet aware of the magnitude of the potential risk.

Many may take issue with the ethical and even legal reach of some of these recommendations as intrusive on privacy. What might be the form of screening? Legal but potentially impairing prescriptions are procured under the employer's group health plan, and our norm is that the employer should not have access to, be informed of or act on information regarding clinical conditions. Privacy is a sacred value, but so are public health rights to safety and protection. Prescription drugs for mental health conditions ranging from depression and anxiety to mild sleep disorders have proliferated with direct-to-consumer advertising which creates demand artificially by bypassing physicians (a practice banned in Europe and many other nations). Should bus drivers transporting 90 people or long-haul tractor-trailer drivers be driving legally impaired?

Stress in the workplace is a public health issue. It needs to be addressed and proactively managed as a population-based problem. Under the Affordable Care Act mental health has achieved parity with other medical benefits. The costs of stress in the American workplace are huge, with incidence and prevalence rates that are shockingly high. Were this outbreak an infectious disease that we could vaccinate against, we would make an urgent national effort. Because it is less visible, employers, risk managers, clinicians, public health advocates, ethicists, elected officials and policy-makers should engage on how to attack the problem.

References

Adams, C. (2013). *Millions went to war in Iraq, many with lifelong scars*. Retrieved from http://www.mcclatchydc.com/2013/03/14/185880/millions-went-to-war-in-iraq-afghanistan.html

American Psychological Association. (2008). *Stress in America, 2008.*

American Psychological Association. (2013). *Stress in America: Missing the health care connection.*

Anxiety and Depression Association of America. (2014). *Generalized Anxiety Disorder.*

Anxiety and Depression Association of America. (2014b). *Understanding the Facts.*

Belsher, B., Tiet, Q. Q., Garvert, D. W., & Rosen, C. (2012). Compensation and Treatment: Disability Benefits and Outcomes of U.S. Veterans Receiving Residential PTSD Treatment. *Journal of Traumatic Stress , 25*, 494-502.

Bureau of Labor Statistics. (2013). *Employer-reported workplace injuries and illnesses – 2012*. Retrieved from http://www.bls.gov/iif/oshsum.htm

Bureau of Labor Statistics. (2013b). *Nonfatal occupational injuries and illnesses requiring days away from work, 2012*. Retrieved from http://www.bls/gov/iif/oshcdnew.htm

Centers for Disease Control and Prevention. (2011). *Mental lllness surveillance among adults in the United States.* Morbidity and Mortality Weekly Report.

Centers for Disease Control and Prevention. (2013). *NIOSH Program Proposal: Work organization and stress-related disorders.*

Federal Motor Carrier Safety Administration. (2001). *Code of Federal Regulations, Title 49, Part 382.* Retrieved from Retrieved from: http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=56b1b857e9557ca5c8c2515920fe81d7&ty=HTML&h=L&r=PART&n=49y5.1.1.2.25

Federal Motor Carrier Safety Administration. (2006). *Expert Panel Commentary and Recommendations: Licit Schedule II Drug Use and Commercial Motor Vehicle Driver Safety (Comprehensive Review).*

Friswell, R., & Williamson, A. (2010). Work characteristics associated with injury among light/short-haul transport drivers. *Accident Analysis and Prevention , 42*, 2068-2074.

Greenberg, P., Sisitsky, T., Kessler, R. C., Finkelstein, S. N., Berndt, E. R., Davidson, J. T., et al. (1999). The Economic Burden of Anxiety Disorders in the 1990s. *Journal of Clinical Psychiatry , 60*, 427-435.

Health Advocate. (2009). *Stress in the workplace.*

Julià, M., Catalina-Romero, C., Calvo-Bonacho, E., & Benavides, F. (2013). The impact of job stress due to the lack of organisational support on occupational injury. *Occupational Environmental Medicine , 70*, 623-629.

Kaufman, J. &. (2000). Comorbidity of mood and anxiety disorders. *Depression and Anxiety , 12* (1), 69-76.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry , 62* (6), 593-602.

Kessler, R. C., Heeringa, S., Lakoma, M. D., Petukhova, M., Rupp, A. E., Schoenbaum, M., et al. (2008). Individual and societal effects of mental disorders on earnings in the United States: results from the National Comorbidity Survey Replication. *American Journal of Psychiatry , 165* (7), 703–711.

Kim, J. (2008). Psychological distress and occupational injury: Findings from the National Health Interview Survey 2000-2003. *Journal of Preventive Medicine and Public Health , 41* (3), 200-207.

Lane, M. E., Hourani, L. L., Bray, R. M., & Williams, J. (2012). Prevalence of perceived stress and mental health indicators among reserve-component and active-duty military personnel. *American Journal of Public Health , 102* (6).

Leigh, J. P. (2011). Economic burden of occupational injury and Illness in the United States. *The Milbank Quarterly , 8* (4), 728-772.

Leung, S. Y. (2011). Benzodiazepines, opioids and driving: An overview of the experimental research. *Drug and Alcohol Review , 30*, 281-286.

Litz, B. T., & Schlenger, W. E. (2009). PTSD in service menbers and new veterans of the Iraq and Afghanistan wars: A bibliography and critique. *PTSD Research Quarterly , 20* (1).

MacDonald, H. A., Colotla, V., Flamer, S., & Karlinsky, H. (2003). Posttraumatic stress disorder (PTSD) in the workplace: A descriptive study of workers experiencing PTSD resulting from work injury. *Journal of Occupational Rehabilitation , 13* (2).

MacFarlane, A. C., & Bryant, R. A. (2007). Post-traumatic stress disorder in occupational settings: anticipating and managing the risk. *Occupational Medicine , 57*, 404-410.

Matusko, D. B., Kemp, R. I., Peterson, H. M., & Bryant, R. A. (2013). The assessment of post-traumatic stress disorder for workers' compensation in emergency service personnel. *Australian Psychologist , 48*, 420-427.

McCaughey, D., McGhan, G., Walsh, E. M., Rathert, C., & Belue, R. (2013). The relationship of positive work environments and workplace injury: Evidence from the National Nursing Assistant Survey. *Health Care Mamagement Review* .

McVicar, A. (2003). Workplace stress in nursing: a literature review. *Journal of Advanced Nursing , 44* (6), 633-642.

Milliken, C. S., Auchterlonie, J. L., & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq War. *JAMA , 298* (18).

Moden, B., Ohlsson, H., & Rosvall, M. (2011). Psychotropic drugs and accidents in Scania, Sweden. *European Journal of Public Health , 22* (5).

National Institute of Mental Health. (2013). *The numbers count: Mental disorders in America.*

Occupational Safety and Health Administration. (2014). *Safety and health add value*. Retrieved from https://www.osha.gov/Publications/safety-health-addvalue.html

Office of Disability Employment Policy. (2014). *Post-Traumatic Stress Disorder (PTSD) & Employment.*

Oster, G., Huse, D. M., Adams, S. F., Imbimbo, J., & Russell, M. W. (1990). Benzodiazepine tranquilizers and the risk of accidental injury. *American Joumal of Public Health , 80* (12).

Pratt, L., & Brody, D. (2008). *NCHS Data Brief. Depression in the United States household population, 2005-2006.* U.S. Department of Health and Human Services.

Quick, E. (2011). Meeting the needs of returning veterans in the workplace. *CDM Source* .

RAND Center for Military Health Policy Research. (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery.*

Rose, J. (2006). A Model of Care for Managing Traumatic Psychological Injury in a Workers' Compensation Context. *Journal of Traumatic Stress , 19* (3), 315-326.

Sekula, L. K., DeSantis, J., & Gianetti, V. (2003). Consideriation in the management of the patients with comorbid depression and anxiety. *Journal of the American Academy of Nurse Practitioners , 15* (1), 23-33.

Shea, M. T., Vujanovic, A. A., Mansfield, A. K., Sevin, E., & Liu, F. (2010). Post-traumatic stress disorder symptoms and functional impairment among OEF and OIF national guard and reserve veterans. *Journal of Traumatic Stress , 23* (1), 100-107.

Surgeon General. (1999). *Mental Health: A report of the Surgeon General.* National Institute of Mental Health.

Vecchio, N., Scuffham, P. A., Hilton, M. F., & Whiteford, H. A. (2010). Work-related injury in the nursing profession: an investigation of modifiable factors. *Journal of Advanced Nursing , 67* (5), 1067-1078.

Wadsworth, E. K., Moss, S. C., Simpson, S. A., & Smith, A. P. (2005). Psychotropic medication use and accidents, injuries and cognitive failures. *Human Psychopharmacology: Clinical and Experimental , 20*, 391-400.

Weis, J. M., Grunert, B. K., & Christianson, H. F. (2012). Early versus delayed imaginal exposure for the treatment of post-traumatic stress disorder following accidental upper extremity injury. *American Association for Hand Surgery , 7*, 127-133.