

Ergonomics Solutions for Women in the Workplace

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Introduction

Women in the workplace suffer a disproportionate number of many types of ergonomics-related injuries, particularly when insufficient attention has been paid to the design of work, equipment, workstation, and environment. The biological and physiological characteristics of a female can present different risks for musculoskeletal disorders (MSDs) from the male. In this paper, these differences and how they need to be addressed to provide a safe and healthy work environment for women in industry and the office will be discussed. Topics will include an overview of musculoskeletal disorders involving women, job hazard/risk factor analysis and control or prevention through medical management, fitness/exercise, posture and body mechanics.

At all stages of their working careers, women are more likely than men to work part time, to have lower status jobs, and to earn less than men. Poorly paid work that is demanding yet offers little control is the most psychologically, and perhaps physically, stressful. Some female-dominated professions, such as healthcare, require moving heavy loads and adopting awkward working postures, while office work requires high levels of static muscular contraction. Women are also more likely than men to be performing work that involves repetitive tasks, working at workstations, and using tools that were designed for men. All four issues—force, poor posture, static muscular contraction, and repetition—are known risk factors for musculoskeletal disorders.

Alongside the physical hazards in the workplace, women more commonly face risks at home as well. Activities still more often performed by women than men include lifting heavy children and groceries, moving dependent adults, and performing repetitive tasks like cooking, cleaning and other housekeeping chores.

Women More Prone to Musculoskeletal Disorders (MSDs)

Women are at least two (2) times more prone than men to develop MSDs of the upper body according to Delia Treaster and Deborah Burr, Ohio State University scientists. Some researchers suspected that women were more likely to admit pain and seek treatment. Conventional wisdom held that men do physically demanding work leading to back pain, and women do fine, repetitive work that leads to neck, shoulder and wrist problems. This study showed women more likely than men (2 to 11 times) to develop MSDs even when both women and men have the same job. The U.S Department of Health and Human Services reported in the publication, *Musculoskeletal Disorders and Workplace Factors* (1997), that researchers believe the reasons are a combination of biomechanical, physiological, psychological and other factors.

Why Are We Seeing an Increase in MSDs in Women?

Many reasons have been evaluated when trying to establish a cause for the increase in MSDs in women as well as the population in general. Some factors that have been proposed as related to this issue include:

- Decreased level of physical fitness
- Aging workforce
- Increased work load
- Obesity issues
- Psychological stresses (work and home)
- Change in work ethic
- Better educated on MSDs
- Static work and home postures
- One size fits all in job, home and recreational activities

Healthcare Expenses in the United States

According to the United States Department of Labor, healthcare expenses increased from \$1.4 trillion dollars in 2001 to \$2.1 trillion in 2006. Annual increases are predicted to be 7.3% by Medicare and as much as 15-17% by private agencies. The actual increase was 14.4% in 2002.

In most states workers' compensation costs exceed that of group health insurance. In the February 11, 2005, edition of the *Washington Post*, staff writer, Ceci Connolly, reported that in 2003, General Motors Corporation spent \$4.8 billion dollars on healthcare expenses for 195,000 workers and 450,000 retirees. GM states that healthcare costs are the biggest obstacle in competing with foreign companies.

Our Aging Workforce and Statistics on MSDs for Women

In 1972 the average age of an employee in the United States was 28. In 2006 the average age of our workforce was 46. Some of the differences between a 28-year-old and a 46-year-old could include decreases in strength, endurance, flexibility, reaction time, and eyesight.

Women are 46% of the workforce and experience 33% of work-related injuries and illnesses but report 63% of MSDs that result in lost work time. Women report 70% of carpal tunnel syndrome and 62% of tendonitis that results in lost work time. MSDs account for 50% of women's lost work-time injuries. Women have 86% of the repetitive motion injuries and 78% of the tendonitis increases since 1996.

Women, Obesity and MSDs

Weight-to-height ratio or body mass index (BMI—a ratio of weight to height squared), and obesity have all been identified as potential risk factors for MSDs, especially carpal tunnel syndrome (CTS) and lumbar disc herniation. Obese patients (BMI>29) were 2.5 times more likely than slender patients (BMI<20) to be diagnosed with CTS.

Other chronic diseases linked to obesity include osteoarthritis; type 2 diabetes, which increases the risk for CTS; and sleep apnea, which increases fatigue and, therefore, the chance of accident and error.

Being overweight can contribute to back pain by increasing the wear and damage to joints, causing irritation, pain, and reduced activity. This lack of activity can cause further weight gain. Back problems can also result from inadequate nutrition. Not consuming the correct nutrients can cause chemical changes that weaken structures, increase fatigue and slow or prevent your body from healing.

Hagberg and Wegman (1987) found that neck and shoulder pain is more common in females than males in the general and work population. Ulin et al. (1993) noted postural differences at work were related to stature. Lack of workplace accommodation to height and reach may also play a role, since most tools and workstations are designed for men.

Use of tobacco products is also related to increased risk of MSDs. Of the adult population, 20.9% used tobacco in the U.S. in 2005, according to the CDC; of those, 23.9 % were male and 18.1% female. Use of tobacco causes coughing to increase, which, in turn, increases abdominal and intradiscal pressure. Other related issues include that nicotine induces diminished blood flow and mineral content of bones, causing microfractures. Diminished blood flow increases the risk of Reynaud's disease or arm-hand vibration syndrome as well.

Osteoporosis is more of a problem for women than men. Men have greater bone mass than women at all ages. Peak bone mass for a woman occurs at age 30; after menopause, women may lose 50% of bone mass. Men may lose 25% as they age. Men have greater bone mass and only experience half the loss as they age. According to research conducted by the Women's Sports Foundation, girls that participate in weight-bearing sports before the age of 12 are 60% less likely to develop osteoporosis. One way to prevent osteoporosis is by exercise as long as it is not excessive.

Women, Their Work and Their Health

Women are 46% of the workforce in the U.S. Sixty percent of the total female population is employed outside of the home. In healthcare, women represent over 80% of the workforce. Women experience 33% of work-related injuries/illnesses but suffer 63% of all work-related MSDs.

For most women in the workforce, job-related stress is high. Some of the issues that contribute to stress include: hours of work, job design, scheduling, interpersonal factors, management style, and the organizational climate.

Women and Spinal Dysfunction

Just being a woman is a problem for the spine. Thirty-three percent of women 16-24 years of age and 50% of women 45-64 years of age reported back pain in 2006. Women's menstrual cycles can trigger back pain due to the issues associated with hormonal fluctuation, including osteoporosis, which increases the chances of microfractures of the spine, as well as osteoarthritis.

In the U.S., Javier Fuller (2006) indicated that 50% of pregnant women report back pain, and that domestic work and child care greatly increase stress on the spine. Some of the main triggers from the home environment include carrying heavy objects, gardening, and vacuuming. Fashion issues, such as shoes, clothing and breast implants, have also been associated to back pain in women.

Some of the risk factors for back pain due to pregnancy include awkward postures, forces from heavy lifting, repetition, and fatigue without rest. During pregnancy, the center of gravity is shifted forward, causing postural changes and increase in forces/stress on the lumbar spine. Due

to hormonal issues, the ligaments are weakened, making joints less strong and placing increased stress on the muscles. Stressed muscles lead to fatigued muscles, and fatigued muscles lead to muscle spasm, pain, and dysfunction.

Women are involved with more whiplash/cervical spine injuries from motor vehicle accidents, and recover more slowly than men. Eighty thousand nurses injure their backs annually, and 3,600 are left disabled and unable to return to work as nurses. A total of 44 million workdays are lost each year by women due to back pain.

Only 17% of women with work-related back pain had any training on care of the back.

Why are Women at Risk for Musculoskeletal Disorders (MSDS)?

Environmental:

1. Job site and equipment *not* designed for women
2. Temperature—Women more sensitive to extreme temperatures
3. Lighting issues
4. Noise/sound issues
5. Motor activities are more difficult for women

Administrative:

1. Length of work day
2. Less job and task rotation at work
3. Fewer breaks if not in a management job

Prevention of MSDs to Women

Avoid or Limit:

1. Strenuous work
2. Work requiring balance
3. Heavy lifting (51-75 pounds)
4. Loud noise
5. Shift work
6. Temperature extremes
7. Long hours (more than 8 hours per day/40 hours per week)
8. Non-adjustable workstations
9. Prolonged sitting
10. Prolonged standing

Ideas for Reducing or Controlling Risks Factors for MSDs for Women

According to OSHA, the best ways to reduce or control exposure to risk factors for musculoskeletal disorders are: administrative, engineering, personal protective equipment and work practices controls.

Administrative controls decrease the duration, frequency or amount of exposure of the risk factor by job and task rotation, matching the worker to the work demands with a functional capacity evaluation (FCE), job enlargement by adding non-stressful tasks, and employer-authorized ergonomic (ergo) breaks.

Engineering controls are fitting the job to the person by modifying and redesigning the workstations, equipment, tools, facilities, materials, processes or environment of the worksite. As we have previously noted, many work areas were designed by men for men. Forty-six percent of our workforce is female. The best place to apply ergonomics principles is during design, not after the issue becomes a problem. It is much cheaper to build it correctly in the first place than to retro fit. Engineering controls should be proactive not reactive.

Personal protective equipment (PPE) is not back belts, wrist splints or tennis elbow straps. Such orthopedic devices may be considered medical management or treatment by OSHA. PPE for musculoskeletal disorders for women includes items that will protect them from contact stress, such as standing floor mats, shoe inserts, and anti-vibration gloves.

Work practice control is safety through education. With this category of intervention, the goal is to change the way a worker approaches and performs the job due to education. Such things as instruction in neutral postures, correct body mechanics, and observance of ergo breaks can minimize the risk factors of the work environment.

Additional Ideas for Risk Reduction

Another effective way to decrease the severity and duration of musculoskeletal disorders to women is the correct application of medical management principles. Instructing supervisors, and perhaps even employees, to recognize early warning signs of MSDs and how to apply correct first aid can be invaluable in the management process. Developing appropriately modified or restricted duty jobs or tasks can speed recovery and decrease the likelihood of re-injury upon return to work. It is imperative that this modified duty be limited in time and vigorously supervised for optimum results.

Summary

Women have come a long way in the last 50 years in their struggle for equality in the work environment. To decrease the socially and financially debilitating issue of women in the workplace suffering a disproportionate number of ergonomics-related injuries in the 21st century, we must address the deficiencies of our programs on ergonomics, education and exercise/fitness.

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