

## **PREGNANCY & ERGONOMICS**

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Today, more than half of all American women work outside the home. In 1998, women accounted for 46.2 percent of the total workforce - a percentage that is expected to increase over time (BLS; Misner, et al). Assuming a two percent pregnancy rate and 50 million women of childbearing age, nearly 1 million working women may be pregnant at one time.

With such a large number of employees who may become pregnant, it is important to understand how pregnancy can impact workplace safety. Often, discussion of risks related to pregnancy focuses on chemical exposure. However, ergonomic concerns exist as well.

For example, pregnancy can affect reach distance, balance and lifting tasks; it can also aggravate the effects of repetitive motion. Some research also suggests a link between certain ergonomic stressors and adverse pregnancy outcomes, such as spontaneous abortion, pre-term delivery and low birthweight (AMWA). Several studies have found an increased risk of pre-term delivery among women whose jobs involve a combination of stressful factors, such as standing for long durations, repetitive lifting and working long hours (Henriksen 198+, Mabelle 309+). This article examines ergonomic stressors in the workplace that may affect the pregnant worker and outlines proactive steps the safety practitioner can take to minimize these hazards.

### **The Potential Hazards**

As noted, most employers immediately consider the harmful effects of chemicals in the workplace when first notified of a pregnancy. In addition, many obstetricians will ask for a list of the chemicals that may present a risk of exposure to the pregnant employee.

Less obvious, yet equally important to the pregnant employee's health and well-being, are ergonomic hazards such as awkward postures, heavy lifting, limited rest periods and repetitive force. Back pain and carpal tunnel syndrome (CTS) are relatively common side effects of pregnancy as well, and both may be aggravated by job tasks. In addition, the incidence of both may increase as pregnancy progresses.

Pregnancy alters the body's shape and thus, the interaction with the worksite. The abdomen becomes increasingly larger, causing progressive postural problems, backache, and impairment of dexterity, agility, coordination and balance. Hormonal changes affect the ligaments, increasing the likelihood of injury (Goodwin). Joints in the spine become less stable and show signs of separation and movement to accommodate the growing fetus.

As the pregnant worker's body changes shape, new hazards related to reach, balance, lifting and repetitive motion may develop. Employers must be aware of these changes in order to continue to provide a safe, comfortable workplace.

### **Reach Distance**

As pregnancy progresses, a woman must lift and maneuver objects farther from her body. For example, a packaging-line employee who has always had a comfortable reach of 15 inches may have a 20 inch reach once into the third trimester due to the increased size of her abdomen. This places additional strain on the arms and shoulders as well as the lower

back. A study of working surface height and working surface areas showed that fit problems are likely during pregnancy (Paull, et al 129). In addition, few (if any) anthropometric studies of pregnant women have been conducted, so it is difficult to find standardized information on appropriate workstation design.

Lifting loads farther from the spine is especially dangerous during this time because the woman's muscles and ligaments are already being stressed beyond normal levels. Pelvic muscles relax and spine joints become less stable, which only increases the risk of back injury ("The Most Dangerous Job").

These risks are most prominent during the third trimester, when the reach distance is greatest. A woman lifting 10 lbs. has about 65 lbs. of pressure on her lower back. When this woman is nine months pregnant, this task places approximately 150 lbs. of pressure on her lower back due to the increased distance between the load and the body.

## **Balance**

The extra weight a pregnant woman carries also affects balance. In a non-pregnant woman, the center of gravity is located just in front of the spine, level with the kidneys. Increased weight during pregnancy shifts the center of gravity forward, which affects balance. Awkwardness, fatigue and tendency to lose balance become critical when quick reaction time or work on elevated surfaces is required. For example, work on platforms or the use of step stools may now present a greater hazard.

## **Lifting Tasks**

Additional body weight and increased reach distance also impact lifting tasks. When a pregnant employee bends over to pick up a box, she is not only lifting the box, but also her extra body weight (Eastman 135). Depending on the size of the abdomen, she will likely be unable to hold the object close to her body. Lifting heavy weights is often thought to be the cause of back pain. However, pregnant women may experience back pain even when their job involves little or no lifting. According to some sources, up to 50 percent of pregnant women experience back pain regardless of their occupation (Colliton).

Lifting may affect the pregnancy and fetus in several ways. Muscular activity alters blood flow in the body, and circulatory blood flow in the uterus and placenta decreases while the woman is in a standing position. In addition, heavy lifting affects intra-abdominal pressures, which may provoke uterine contractions (Bodin 90). Significant physical exertion may lead to hormone disturbances, hyperthermia, and nutritional deficits, all of which may have a negative effect on the fetus.

Pregnancy also changes the amount of weight an employee can lift safely. According to a study conducted by Texas University in 1988, which compared upper limb strength of pregnant and non-pregnant working women, non-pregnant women were found to be significantly stronger. The researchers concluded that this finding could have safety implications for the mother and fetus and, therefore, should be considered in job assignment (Goodwin, Master and Smith). American Medical Women's Assn. (AMWA) suggests that risk management programs include a weight restriction of 25 lbs. (10 to 12 kg) for pregnant women (AMWA).

## **Standing**

As pregnancy progresses into later states, the curve in the lower back increases, which means the back muscles must work harder to help the woman maintain her balance. As a result, after standing for an extended period, the woman may experience lower back pain. Some studies have shown that prolonged standing is a serious pregnancy risk factor. A study of members of the Assn. of Women's Health, Obstetric and Neonatal Nurses found that those who worked more than 36 hours per week, more than 10 hours per day or who stood for more than four to six hours per day had an increased rate of pre-term deliveries (Gabbel).

## **Repetitive Motion**

CTS is a common side effect of pregnancy - approximately 28 percent of pregnant women experience it (Hagberg). The extra fluid in the body can cause swollen feet, hands and legs; in hands and wrists, this extra fluid can compress the median nerve, producing CTS symptoms. Most health practitioners would attribute this development to pregnancy rather than to work. However, tasks that require repetitive motions may increase the possibility of developing the condition. Fortunately, pregnancy-related CTS usually disappears after the birth of the child.

## **Industry Challenges**

While the challenge of maintaining an ergonomically correct workplace in manufacturing and office environments can often be met successfully, some industries, including the airline industry, healthcare and government services - often have more difficulty accommodating a pregnant worker, particularly in the third trimester, due to required daily tasks associated with jobs in those industries.

### **Airline Industry**

Many airlines "ground" female cabin staff after the first trimester because it is impossible to redesign the interior of an aircraft to accommodate a pregnant worker. Flight attendants routinely help passengers place heavy items in overhead storage areas and push food and beverage carts ( which weigh up to 143 lbs. fully loaded) up an incline as the airplane climbs. In addition, they are responsible for passenger safety, a function that may include lifting heavy life rafts, opening cabin doors and sliding down chutes. Although situations in which these tasks must be performed are rare, flight attendants must perform these activities during regular practice drills (Goodwin).

### **U.S. Navy**

Servicewomen are another group whose routine tasks may be severely affected by pregnancy. U.S. Navy operational obstetrics policy states that for an uncomplicated pregnancy of a physically fit, trained servicewoman who works in a safe environment, there is little need to restrict duty. An "ergonomic restriction" would apply "where (an) individual's physical configuration and or disabilities preclude her from continuing with specific activities ( such as lying in a prone position for weapons qualification, diving duty, attendant aboard ships, etc. ) or where nausea or fatigability to work becomes a hazard" (Virtual Naval Hospital). The Navy allows pregnant women to rest with their feet up for 20 minutes once every four hours; it also limits the employee to a 40-hour workweek during the last three months of pregnancy.

### **Healthcare Industry**

A union study found that 17 of 100 nursing home workers are hurt each year - with half of those incidents involving back injuries. The Ontario Workplace Health and Safety Agency found that nurses and nursing aides are particularly susceptible to sprains and strains. In many cases, the injuries are attributed to tasks that involve moving patients. ("The Most Dangerous Job").

In addition, female physicians have an increased risk of premature labor compared to the general population. Some research suggests that this risk may be the result of long workhours and excessive standing. Fifty percent of female physicians have their first baby during residency training, while 25 percent have their second baby during this period (AMWA). Few medical schools have written policies regarding the health and safety of pregnant physicians or students.

### **Solutions**

Many firms have established ergonomic programs and strive to provide a comfortable, safe work environment for all employees. Designers typically attempt to create a workstation that will accommodate the smallest ( 5th percentile female) to the largest ( 95% percentile male) worker. Adjustable workstations may meet this criteria - until a worker becomes pregnant.

In addition to work restrictions, the safety professional can implement several proactive steps to protect pregnant employees. Each pregnancy is unique, so care must be taken to match job requirements to the individual's performance and capabilities. All aspects of the job should be assessed when considering workplace modifications.

## Potential Modifications

While application of sound ergonomic principles benefits all workers, the following actions can be considered when modifying a pregnant worker's job.

- Assign less physical tasks
- Restrict lifting to 25 lbs
- Adjust work hours (e.g., flexible scheduling, day shift rather than night)
- Vary tasks to avoid static posture
- Install foot rests ( for seated and standing workers) so that one foot can be alternately raised.
- Adjust height of work surfaces and chairs. Women late in pregnancy may prefer a considerable lower table height than common guideline heights ( Paull, et al 129+)
- Limit standing time to less than three hours a day
- Modify break schedule ( e.g., shorter, more frequent breaks)
- Reduce amount of work performed at heights ( such as on ladders or stepstools)

## Conclusion

Pregnant workers require extra attention with respect to potential ergonomic hazards that are either created or exacerbated by pregnancy. Thus, when a pregnancy is first reported, the safety professional must work with the occupational nurse / physician, employee and her physician to assess these hazards. Appropriate accommodations can prevent injuries, enhance the employee's comfort, and help her better handle the stress of work combined with the physical changes related to pregnancy.

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