Job Stress, Shiftwork and Extended Work Shifts

October 25, 2010
PUBH 3310

Supplemental Resources

- The Basics of Occupational Safety (course text)
  - Chapter 9 “Stress and Safety”
- Selected Internet websites, as noted in this presentation

Objectives

- Objectives
  - Know effects of job stress, shiftwork, and extended work hours
    - How many workers affected
    - Diseases and disorders
    - Accidents
  - Understand the NIOSH Model of Job Stress
  - Be familiar with recommended methods to
    - Reduce Job Stress
    - Reduce effects of shiftwork and extended work hours

Introduction

- Job stress, extended work hours and shiftwork lead to injuries and illnesses
  - Many workers at risk
  - Increasing incidence if illness and injury
- Risk is not from hazardous workplace conditions
  - Management controls the exposure to these stressors
  - Personal and situational factors affect the outcome
- Controlling risk
  - No OSHA standards
  - Rather, guidance is from NIOSH and other sources

Job Stress

- Job Stress Definition
  - Harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker

Job Stress

- Conditions leading to Job Stress
  - Task Design
    - Heavy workload, infrequent breaks, long hours and shiftwork, tasks with little inherent meaning
  - Management Style
    - Lack of participation by workers in decision-making
    - Poor communication in the organization
    - Lack of family-friendly policies
  - Interpersonal Relationships
    - Poor social environment
    - Lack of support or help from coworkers and supervisors
## Job Stress

### Conditions leading to Job Stress
- **Work Roles**
  - Conflicting or uncertain job expectations
  - Too much work
  - Too many "hats to wear"
- **Career Concerns**
  - Job insecurity
  - Lack of opportunity for growth or advancement
- **Environmental Conditions**
  - Unpleasant or dangerous physical conditions like crowding, noise, air pollution, or ergonomic problems

### Magnitude of the problem
- One third of workers report “very or extremely stressful” job conditions
- One fourth of employees say jobs are the number one stressor in their lives
- Problems at work affect health more than any other life stressor

### Health effects of Job Stress
- Increased risk of musculoskeletal disorders
- More of indoor air quality complaints
- Psychological disorders
  - Decreased productivity, absenteeism, high turnover rates
  - Anxiety, stress and neurotic disorders
- Increased risk of workplace injury
- Cardiovascular disease

### Statistics for anxiety, stress and neurotic disorders
- **Severity**
  - Stress illnesses are much more serious
    - 25-day mean time away for anxiety, stress and neurotic disorders
    - 6-day mean time away for all injuries/illnesses
- **Affected industries**
  - Highest rates in transportation and public utilities, finance, insurance and real estate, and services

### Statistics for anxiety, stress and neurotic disorders (cont.)
- **Magnitude**
  - About 5000 annual lost-day cases
  - 0.6 cases per 10,000 workers
- **Demographics**
  - Widely distributed among age groups
  - 2/3 of the cases are among women
  - Hispanics may have proportionally more cases
    - 21% of cases
    - 13% of workforce

### Affected industries
- Highest rates in transportation and public utilities, finance, insurance and real estate, and services

### OSHA:
- **Work-related stress is recordable as a mental illness case:**
  - Mental illnesses, such as depression or anxiety disorder, that have work-related stress as a contributing factor, are recordable if the employee voluntarily provides the employer with an opinion from psychiatrist, psychologist, psychiatric nurse practitioner, etc. stating that the employee has a mental illness that is work-related.

### Utah Workers Compensation
- Mental stress is covered under workers’ compensation in very limited circumstances. Good faith employer personnel actions (disciplinary actions, work evaluations, retirements) are not covered under workers’ compensation. Alleged discrimination, harassment, or unfair labor practices may not form the basis of a mental stress claim.
Number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry, 1992–2001

Annual rates of anxiety, stress, and neurotic disorder cases involving days away from work in private industry, 1992–2001

Distribution and number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by age, 2001

Distribution of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by sex, 1992–2001

Distribution of anxiety, stress, and neurotic disorder cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Anxiety, stress, and neurotic disorder cases tended to involve higher percentages of long-term work loss.
Distribution of anxiety, stress, and neurotic disorder cases and all nonfatal injury and illness cases involving days away from work by private industry sector, 2001

<table>
<thead>
<tr>
<th>Sector</th>
<th>Days Away from Work (Nonfatal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial and professional</td>
<td>1,331 (23.6%)</td>
</tr>
<tr>
<td>Technical, sales, and</td>
<td>2,250 (49.9%)</td>
</tr>
<tr>
<td>Administrative support</td>
<td></td>
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<tr>
<td>Service</td>
<td>703 (14.1%)</td>
</tr>
<tr>
<td>Farming, forestry, and</td>
<td></td>
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<tr>
<td>fishing</td>
<td></td>
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<tr>
<td>Precision production,</td>
<td></td>
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<tr>
<td>craft and repair</td>
<td></td>
</tr>
<tr>
<td>Operators, fabricators,</td>
<td></td>
</tr>
<tr>
<td>and laborers</td>
<td></td>
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</tbody>
</table>

Incidence rate of anxiety, stress, and neurotic disorder cases by private industry sector, 2001 (no data available for agriculture, mining or construction)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Rate per 10,000 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, and</td>
<td></td>
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<tr>
<td>fishing</td>
<td></td>
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<tr>
<td>Mining</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.5</td>
</tr>
<tr>
<td>Transportation and</td>
<td>0.3</td>
</tr>
<tr>
<td>public utilities</td>
<td>0.0</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>1.1</td>
</tr>
<tr>
<td>Retail trade</td>
<td>1.1</td>
</tr>
<tr>
<td>Finance, insurance, and</td>
<td></td>
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<tr>
<td>real estate</td>
<td></td>
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<td>Services</td>
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Annual rates of anxiety, stress, and neurotic disorder cases involving days away from work by private industry sector, 1992–2001

Job Stress

- NIOSH model of Job Stress
  - Exposure to stressful working conditions can have a direct influence on worker safety and health
  - Individual and other situational factors can intervene to strengthen or weaken this influence

NIOSH model of Job Stress

NIOSH model of Job Stress (simplified)
NIOSH model of Job Stress (simplified)

- Stressful working conditions (job stressors) can have a direct influence on worker safety and health.
- Individual and other situational factors can intervene to strengthen or weaken this influence.

Job Stress

- Two approaches to controlling Job Stress
  1. Stress Management Training
  - Improve ability for worker to deal with stress
  2. Organizational Change
  - Reduce job stress
- NIOSH recommends a comprehensive approach.

Controlling Job Stress

1. Stress Management Training
   - Teach workers about stress and how to control it
     - Time management, relaxation exercises, etc.
     - Counsel employees with work and personal problems
     - Advantages
       - May have rapid reduction of stress symptoms
       - Inexpensive and easy to administer
     - Disadvantages
       - Benefits often short-lived.
       - Ignores important root causes of stress
       - Focus is on the worker and not the environment (re. the NIOSH model)

2. Organizational Change
   - Identify stressful aspects of work (e.g., excessive workload, conflicting expectations)
   - Design of strategies to reduce or eliminate the identified stressors.
   - Advantages
     - Deals directly with the root causes of stress at work.
   - Disadvantages
     - Can involve changes in
       - Work routines
       - Production schedules
       - Organizational structure

NIOSH Job Stress Prevention Program

- NIOSH comprehensive approach
  - 3-step process
    1. Problem identification
    2. Intervention
    3. Evaluation

NIOSH Job Stress Prevention Program

- Preparing for a Stress Prevention Program
  - Build general awareness about job stress
    - Causes, costs, and control
  - Secure top management commitment and support
  - Incorporate employee input and involvement
  - Establish technical capacity to conduct the program
    - Specialized training for in-house staff or use of job stress consultants)
NIOSH Job Stress Prevention Program

- Step 1 – Identify the Problem.
  - Hold group discussions with employees.
  - Design an employee survey.
  - Measure employee perceptions of job conditions, stress, health, and satisfaction.
  - Collect objective data
  - Analyze data to identify problem locations and stressful job conditions.

NIOSH Job Stress Prevention Program

- Step 2 – Design and Implement Interventions
  - Target source of stress for change
  - Propose and prioritize intervention strategies.
  - Communicate planned interventions to employees.
  - Implement interventions
    - Stress Management Training
    - Organizational change
    - Etc.

Shiftwork

- Introduction
  - 15.5 million American adults are affected by shiftwork
    - 5% work in the evening
    - 4% on permanent night shift
    - 4% on rotating shifts
  - Shiftwork is hazardous!
    - Increased health risk
    - Increased accident risk
    - Increased social/family problems
  - Leave out the “f”

Shiftwork

- Introduction
  - OSH Act requires employers to provide places of employment “free from recognized hazards”
  - Doesn’t this mean places of employment should be free of sleepy workers?
    - Dr. Howard Leaman, IHC Medical Director, Intermountain WorkMed

- Shiftwork interferes with the body’s biological rhythms
  - Circadian rhythm
    - 20-28 hours
    - Body temperature, sleep, hormone cycles, etc.
  - Also affected by:
    - Time zone shifts (“jet lag”)
    - Extended hours of work
    - Staying up late to study for exams
    - Daylight savings
    - Etc.
Circadian rhythm for sleepiness peaks at 2-4 AM. The homeostatic drive for sleep increases with wakefulness.

Shift Work Sleep Disorder

- Adverse effects (cont.)
  - Shift Work Sleep Disorder, SWSD
    - Fatigue and functional impairment associated with sleepiness
    - Affects 8-24% of night or rotating shift workers
  - Diagnosis
    - Sleepiness correlates with shift schedule
    - Difficulty falling asleep
    - Poor quality sleep
    - Lack of systematic response to sleep-enhancing behavioral changes

Shiftwork

- Adverse effects
  - Loss of sleep
    - Night workers get the least sleep
      - Circadian rhythm makes day sleep difficult
      - Sleeping at inappropriate times
    - Decreased vigilance and increased accident rates

Shift Work Sleep Disorder

- Adverse effects (cont.)
  - Long term health effects
    - Gastro-intestinal problems
    - Heart disease (up to 2X death risk)
    - Psychiatric and social problems
    - Possible breast cancer risk
      - International Agency for Research on Cancer, IARC (2007)
        - Shiftwork that involves circadian disruption is probably carcinogenic to humans (Group 2A).
      - Volume 98 (2010) Painting, Firefighting, and Shiftwork,

Accidents

- The diurnal pattern of on-the-job injuries
  - Kenneth N. Fortson, Monthly Labor Review September 2004
    - “The injury hazard is substantially higher late at night than during regular daytime work hours; the best explanation for this finding is that work at night is dangerous, even adjusting for broad industry-occupation composition and worker fatigue”
  - Historical examples
    - 4:00 a.m. on March 28, 1979
      - Three Mile Island nuclear power plant incident
    - 1:23 a.m. on April 26, 1986
      - Chernobyl nuclear reactor disaster

Note: Employees must be informed of IARC recognized carcinogens in the workplace via Material Data Safety Sheets. Should we tell employees shiftwork can cause cancer?

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Ratio of share of lacerations and fractures to share of hours, by hour worked, all workers under 70 years

Note: 44,000 observations from the Texas Workers Compensation database, 2001
Actual share of injuries and share of injuries explained by industrial and occupational composition, all workers under 70 years (compensates for reduced “white collar” employment at night)

Accidents
- Shiftwork related accidents do not always occur at night
  - BP Texas City refinery explosion, 1:30 pm on March 23, 2005, 15 fatalities
    - Improper communication between shifts
    - Workers had been on mandatory 12 hours/day, 7 days/week schedule since February 21

Organizational changes to reduce shiftwork risk
- Improve Shiftwork Schedules
  - Avoid permanent (fixed or non-rotating) night shift
  - Keep consecutive night shifts to a minimum
  - Avoid quick shift changes
  - Plan some free weekends
  - Avoid several days of work followed by four- to seven-day “mini-vacations”
  - Keep long work shifts and overtime to a minimum
  - Consider different lengths for shifts
  - Examine start-end times
  - Keep the schedule regular and predictable
  - Examine rest breaks

Organizational changes to reduce shiftwork risk
- Change workload distribution
  - Avoid doing most risky work at night
- Avoid poor working conditions
- Avoid electronic monitoring
  - Computerized measures of work output add stress
- Provide good access to health care and counseling
- Provide training and awareness programs
- Social programs
  - “Get togethers”, etc. to reduce feelings of isolation
Individual strategies

• Get enough good sleep
  – Find “your” best time to sleep after night shift – are you a “lark” or an “owl”?  
  • Experiment with different sleep time
  • Keep a written record to help identify the best time

Individual strategies (cont.)

• Get enough good sleep (cont.)
  – Schedule at least 7 hours in bed
    • Rest without sleep still is valuable
  • Most people need at least 6 hours of sleep
  – Stay awake most of the day when coming off night shift
    • Catch up on sleep the next night to quickly restore your circadian rhythm
  – Naps of 20-30 minutes are helpful
    • Allow time afterward for drowsiness to wear off

Individual strategies (cont.)

• Protect sleep
  – Block out noise
  – Keep a regular sleep routine
  – Avoid heavy foods and alcohol before sleep
• Exercise
  – Physical fitness helps resist stress and illness
• Learn relaxation techniques
  – Avoid “fad” diets
  – Eat “healthy” to stay physically fit
• Consider bright light exposure to help reset circadian rhythms
• Avoid over-use of drugs
  – Caffeine, stimulants, alcohol, sleeping pills

Conclusions

• Job stress affects worker’s physical and mental health and leads to increased injury and illness
• Workers with job-related stress disorders have longer duration work loss
• NIOSH recommends reducing job stress factors, since employers cannot control the individual and external factors that affect how employees respond to stress
• Shiftwork interferes with the body’s circadian rhythm, resulting in increased injury rates, psychosocial problems, physical health problems (including heard disease and cancer) and shiftwork sleep disorder
• Employers can improve shift schedules if shiftwork cannot be avoided
• Individuals strategies help workers get adequate sleep

Useful links

• NIOSH links
  – Work Stress web page
    • Includes several resources
      • http://www.cdc.gov/niosh/topics/stress/
  – Overtime and Extended Work Shifts: Recent Findings on Illnesses, Injuries and Health Behaviors (NIOSH)
    • http://www.cdc.gov/niosh/docs/2004-143/
  – Plain Language About Shiftwork
    • http://www.cdc.gov/niosh/pdfs/97-145.pdf
• Canadian Centre for Occupational Health and Safety links
  • http://www.ccohs.ca/oshanswers/psychosocial/stress.html
  • http://www.ccohs.ca/oshanswers/work_schedules/workday.html
  • http://www.ccohs.ca/oshanswers/work_schedules/shiftwrk.html
• Other
  – Diurnal Job Injuries