Combining Ergonomics and Health Promotion: Participatory Models and Integrated Programs

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Ergonomics

“Fitting the job to the person”

The science of designing the job, the tools, and the workplace to be compatible with people’s capabilities and limitations
Ergonomics (1)

Job-level physical attributes (exposures) ... and ...
Work Organization:

How work is organized, supervised, and carried out

Psychosocial Factors:
Subjective perceptions of the work organization
“Psychosocial” Stressors at Work

- Low decision latitude
  - Low skill utilization, no learning opportunities
  - Monotonous work

- High job demands
  - Rapid work pace
  - Time pressure
  - Few rest break opportunities

- Low social support from coworkers and/or supervisor
  - No help to get the job done
  - Poor quality supervision
“Psychosocial” Stressors at Work

- Low rewards, relative to the effort required
- Perceived fairness
  - Discrimination
  - Harassment
- “Emotional labor” (having to mask true feelings to perform job duties)
- Work schedule incompatible with family or personal needs
- Job insecurity
Work organization determines many physical and psychosocial features of work.

- Physical load (E.g., frequency and duration of lifting)
- Psycho-social stressors (E.g., low decision-making, monotony)
- Health effects (e.g., musculo-skeletal disorders)
Can we attribute MSD risk to “psychosocial” vs “physical” strain?
The Workplace as a System

Company Level
(Structure, culture, organizational practices, technology)

Division/Department
(Resources; relation to other departments)

Job Level
(Work pace, supervision, work flow, decision-making opportunities)

Physical Exposures
Psychosocial Exposures

Other workplace exposures:
- Safety hazards
- Chemical, dust, biological, etc.
- Noise, temperature, radiation, etc.

Organizational Outcomes:
- Productivity
- Quality
- Customer satisf.
- Health care costs
- Workers’ comp.
- Absenteeism
- Turnover

Worker Outcomes:
- Health
- Job satisfaction
- Lifestyle
- Productivity
Effectiveness of a Safe Resident Handling Program in the long-term care sector

Photo credits: WA State Dept Labor & Industries; http://www.invacare.com

Total Body Lift

Sit-Stand Lift
“Promoting Physical and Mental Health of Caregivers through Trans-disciplinary Intervention” (Pro-Care)

- Safe Resident Handling Program (SRHP), or “No-Lift Program (NLP), implemented in large chain of nursing homes:
  - Needs assessment
  - Resident lifting equipment
  - Protocols for battery re-charging, sling laundering, labels on residents’ charts
  - Training on policies, operation & maintenance
Safe Resident Handling Program (SHRP) Effectiveness

- Resident handling equipment use increased
- Ergonomic exposures decreased:
  - Time in resident handling
  - Weight in hands
  - Non-neutral body postures
  - Composite biomechanical load index
- Compensation claim rates and costs decreased
- Turnover rates in clinical staff decreased *(might not all be attributable to SRHP)*
- All of these outcomes varied noticeably among centers.
SRHP Equipment Use over Time

Equipment Use* While Repositioning† and Transferring†

Percentage of Reposition & Transfer Observations

- Reposition
- Transfer

Baseline | 3-Month | 12-Month | 24-Month | 36-Month
0% | 10% | 15% | 20% | 70%
Variability of results: Caregivers experienced increasing physical workload where they perceived worse staff-to-staff communication.
Ergonomics (3)

“Fitting the job to the person” includes macro- or system-level issues that define the job and/or impact the worker.

Ergonomists design to support human capabilities and limitations:
- to fix a problem, e.g., a human-machine system with too many “accidents”
- or to increase system efficiency, e.g., improve the usability of a software system
Benefits of a (facilitated) participatory workplace process

Employee health self-efficacy
- Increased decision latitude
- Increased confidence to change unhealthy conditions
- Increased program sustainability
- Increased social support

Insights derived from workers’ perspective
- Find (other) root causes of physical & psychosocial stressors
- Find (other) root causes of unhealthy behaviors
- Reflect own experiences, needs and language of the intended program participants
What is Health Promotion?
Fostering positive decision-making about health

- Traditional focus on the individual’s behavior
  - Stop smoking, healthier diet, cope with stress

- “Social health promotion” - activities at the community or societal level [WHO]
  - Environmental conditions that foster healthy behaviors
  - Positive human relations at work that foster decision-making and self-efficacy
Framing HP in terms of **healthy decision-making** implies that a program’s *process* is as important as its *content*. 
Why Integration?

Traditional HP behavioral targets: Exercise, diet, smoking, obesity, etc.

Well-known risk factors for cardiovascular disease, diabetes, & other chronic diseases – possibly musculoskeletal disorders (MSDs))

These so-called “personal” or “lifestyle” risk factors are also affected by psychosocial features of work, esp. decision latitude
Individual characteristics and MSD risk (1)

- **Obesity**: positive association
  - Biomechanical loading (back, hip, knee)

- **Exercise, sports**: mixed effects
  - Risk of injury/over-use
  - Conditioning

- **Smoking**: mostly consistent *but weak* association (LBP, nk/sh)
  - Reduced circulation, tissue repair
  - Metabolic changes
Individual characteristics and MSD risk (2)

Cardiovascular disease risk factors

・ Serum C-reactive protein (inflammatory marker)
  – Higher risk of sciatica & poorer recovery [Shiri 2007]
  – Frozen shoulder [Bulgen 1982]

・ Serum triglycerides; blood pressure
  – Predicted later sciatica pain [Leino-Arjas 2006a,b]

・ Atherosclerosis: obstruction of lumbar and sacral arteries
  – Disc degeneration; history of chronic low back pain [review by Kauppila 2009]
“Individual characteristics” are also work-related....
## Work environment factors and physical inactivity in men

[Wemme et al. 2005]

<table>
<thead>
<tr>
<th>Job Feature</th>
<th>Relative Risk</th>
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<tbody>
<tr>
<td>Frequent overtime</td>
<td>1.3 (1.1 – 1.6)</td>
</tr>
<tr>
<td>No influence on overtime</td>
<td>1.3 (1.0 – 1.7)</td>
</tr>
<tr>
<td>“Passive” (low demands, low control)</td>
<td>1.7 (1.2 – 2.4)</td>
</tr>
<tr>
<td>“High strain” (high demands, low control)</td>
<td>1.4 (1.0 – 2.0)</td>
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Work environment factors and physical inactivity in men [Wemme et al. 2005]

- Frequent overtime
- No influence on overtime
- “Passive” (low demands, low control)
- “High strain” (high demands, low control)
Work environment factors and smoking [Radi et al. 2007]
Change in waist circumference over 6 years, by job strain group
[Ishizaki et al. 2008]
Implementing our participatory paradigm
CPH-NEW’s approach to integration addresses:

- The (under-appreciated) importance of work organization & psychosocial strain for health behaviors
- Attention to how a program is carried out, not only what health needs it addresses
- Participatory ergonomics as a model for problem-solving
  - Both work-attributable and other health issues
Participatory Health Promotion

- Contribution of work environment to health behaviors justifies intervention to improve decision latitude, social support, etc.
- Integration of health promotion and health protection
- Discrepant perceptions of employees, managers also imply need for participatory approach
- 3 Intervention centers: Initiated participatory Health Protection/Health Promotion teams
- Qualitative evaluations (2010, 2011): More robust employee engagement with participatory teams than “top-down” WHP programs
Integrated OHS and HP Worksite Programs

- **Employee Involvement and Participation**
  - Greater buy-in from all levels
  - Better integration of programs with workplace culture, needs of employees in different subgroups
  - Avoid unforeseen obstacles

- **Sharing resources across departments and functions:**
  - Cost-efficient, less duplication in program offering

- **Common set of metrics can be used by all programs**

- **Reduced competition for senior management attention and scarce resources**

- **Health care costs decrease**

- **Reduces disability and sickness absence**

- **Improve productivity**

- **Affects employee recruitment/retention (employer of choice)?**
Involvement and control by all parties is crucial for sustainability & organizational learning.
Participatory decision-making: To identify a high-priority health/safety concern

(There are many ways to go about this)

1. Use existing data as a guide or starting point
   a) Employee health/work environment survey, focus group, HRA, OSHA logs, WC claim reports, etc.
   b) Team brainstorming exercise to generate a list of health/safety concerns.

2. Prioritize issues/concerns on the basis of:
   • Group voting procedure
   • “Quick wins” during program start-up
   • Likelihood of management support
   (and other organization-specific factors)
A Research-to-Practice Toolkit for Participatory Health Promotion combined with Health Protection

PExHP addresses 3 needs:

– Achieve more effective integration of HP and ergonomics with the overall work organization
– Facilitate sense of employee ownership
– Enhance program sustainability

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