State-of-the-Art Research Perspectives on Musculoskeletal Disorder Causation and Control: Scope of the Problem and Identifying Research Priorities

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Overview

- Scope of the Problem
  - MSD Statistics
  - Costs of MSDs
- Identifying Research Priorities
  - NIOSH NORA MSD Research Agenda
  - NRC/IOM MSD Research Agenda
In 2001, there were **522,528** estimated recordable MSD cases in the US that resulted in days away from work.

Almost **half** the cases (219, 665) involved lifting, and another 13% involved bending, climbing, reaching, and twisting.

There were **60,099** recordable MSD cases due to repetitive motion.

BLS, 2001
Scope of the Problem

- Approximately **67%** of MSD cases were the result of overexertion to the back.
- The median number of days away from work was **8** days, but almost one-fourth of the cases involved more than 31 days away from work.
- **41%** of all MSD cases were accounted for by one occupation—Operators, fabricators, and laborers.

BLS, 2001
Lost workday case incidence rates, injuries and illnesses, private industry, 1982-2001

The incidence rate for lost workday cases declined steadily from 4.1 cases per 100 full-time workers in 1990 to 2.8 cases per 100 full-time workers in 2001. Rates for the two types of lost workday cases moved in opposite directions during that period.

December 2002
Lost workday case incidence rates, injuries and illnesses, manufacturing, 1982-2001

Incidence rates per 100 full-time workers

Lost workday cases

Cases with days away from work

Cases with days of restricted work activity only

The rate for cases with days of restricted work activity only in 2001 remained higher than the rate for cases with days away from work for the fourth consecutive year.

December 2002
Costs of MSDs

- It has been estimated that occupational low back pain accounts for approximately 34% of the cost of all injuries and illnesses combined.
- The cost of OLBP in the U.S. for 1992 was estimated to be 49.2 Billion dollars. Leigh et al., 1997
- Total costs of all work-related MSD cases are not known.
Identifying Research Gaps

- In the last decade, more than 4000 articles focusing on MSDs have been published in the scientific literature.
- A number of these were high quality literature reviews.
  
  Andersson, 1995; NIOSH, 1997; Buckle and Deveraux, 1999; Ferguson and Marras, 1997; Frank et al., 1995, 1996a, 1996b; Krause et al., 1998; Katz et al., 1998; Moore, 1992; Rempel et al., 1998; Szabo, 1998; Viikari-Juntura and Silverstein, 1999; National Research Council, 1999; National Research Council and Institute of Medicine, 2001
National Occupational Research Agenda (NORA)

- MSDs include two of the 21 priority areas
  - Low Back
  - Upper Extremity MSDs
- Fourteen members on the MSD team representing industry, labor, academia, and government.
- Mission was to develop a national research agenda, foster research efforts aimed at prevention of MSDs, and develop partnerships with stakeholders.
NORA MSD Research Agenda

Three main categories:

- Surveillance
- Etiologic and Medical Research
- Intervention Research
NORA MSD Research Agenda

**Surveillance**

- Develop user friendly surveillance tools (exposure and health outcomes)
- Increase collaboration between federal, state, and non-governmental orgs. To encourage comparability of data.
- Conduct an ongoing national hazard survey targeting physical workplace factors.
NORA MSD Research Agenda

- Etiologic and Medical Research
  - Refine instruments to detect and quantify the contribution of risk factors to the disease process.
  - More clearly define stages of MSD process, develop precise diagnostic tools.
  - Clarify the interplay of the factors on causation and treatment of MSDs.
NORA MSD Research Agenda

- Intervention Research
  - Effects of alternative product and tool design criteria
  - Optimization of force, movement, and posture demands.
  - MMH interventions
  - Ergonomic Training
  - Costs/Benefits of interventions
  - Job assignment, placement, etc.
Panel of experts assembled to review the scientific literature about the relationship between work and MSDs of the low back and upper extremities.

Panel consisted of 19 experts in the field of MSD prevention.

Panel was also asked to identify the most important gaps in the science base and recommend needed research.
NRC/IOM Research Agenda

- Methodological Research
  - Improved tools
  - Improved measures of outcomes and case definitions.
  - Further quantify relationships between exposures and outcomes.
NRC/IOM Research Agenda

- **Topical Areas**
  - Tissue mechanobiology studies
  - Biomechanical studies
  - Psychosocial studies
  - Epidemiological studies
  - Workplace intervention studies
Conclusions

- A sizeable amount of quality information has been published about work-related MSDs.
- There was a high degree of similarity in the MSD research gaps identified by two independent groups.
- More research is needed to fully understand the relationship between work and MSDs, especially regarding the interaction of risk factors.