Psychosocial risks and MSDs: what do we know?

Y Roquelaure

University of Angers, CHU Angers, Inserm, Institut de recherche en santé, environnement et travail - UMR_S 1085, France
Introduction

• Economic, industrial and technological revolution

• Changes in work organization and working conditions
  – Management practices and methods for streamlining production
  – New forms of employment increasing flexibility and job insecurity

→ Work intensification
  – Persistent ‘traditional’ exposure to physical stressors
  – Rise of psychosocial factors at work
    • Increased time pressure and responsiveness
    • Increased psychosocial and emotional stressors
    • Conflicts of values at work
    • Conflicts on the quality of work

• Ever-changing socio-economic context
  • Sustainable prevention more difficult to implement
Risk factors for MSDs

- **Individual factors**
- **Physical factors at work**
- **Psychosocial factors at work**

### Aetiological factors
- Influence the onset of an episode of pain or functional impairment.
- Levers of action for primary prevention

### Prognostic factors for chronicity or long-term disability
- Influence MSD-related consequences
- Levers of action for secondary/tertiary prevention

### Work organizational factors
Impact of psychosocial factors at work on MSDs

- Biomedical models: several pathophysioloigcal pathways

Note: below the dotted line: psychosocial stressors may increase risk of MSD via increased biomechanical load or physical strain.
Source: based on Hauke et al. (2011)
Impact of organizational and psychosocial factors at work on MSDs

- **Epidemiological data:**
  - Demand-control-support (Job strain) model
  - Effort-Reward Imbalance (ERI) model
  - Organizational justice
  - Monotonous tasks
  - Job satisfaction
  - Psychological distress (prognosis)

### Meta-analysis of epidemiological studies:
Hauke et al, Work & Stress 2011(25);3: 243-256

<table>
<thead>
<tr>
<th>Non-specific MSDs</th>
<th>Neck/shoulder</th>
<th>Upper extremities</th>
<th>Low back</th>
<th>All body regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low social support</td>
<td>1.15 (1.05–1.26)</td>
<td>1.18 (1.06–1.32)</td>
<td>1.22 (1.07–1.38)</td>
<td>1.16 (1.10–1.23)</td>
</tr>
<tr>
<td>High job demands</td>
<td>1.11 (0.97–1.27)</td>
<td>1.18 (1.06–1.32)</td>
<td>1.34 (1.15–1.58)</td>
<td>1.19 (1.11–1.29)</td>
</tr>
<tr>
<td>Low job control</td>
<td>1.16 (1.05–1.29)</td>
<td>1.24 (1.00–1.54)</td>
<td>1.37 (1.01–1.84)</td>
<td>1.21 (1.10–1.32)</td>
</tr>
<tr>
<td>Low decision authority</td>
<td>1.70 (1.22–2.38)</td>
<td>1.67 (1.04–2.69)</td>
<td>1.19 (0.99–1.44)</td>
<td>1.56 (1.24–1.95)</td>
</tr>
<tr>
<td>Low skill discretion</td>
<td>0.95 (0.63–1.44)</td>
<td>1.32 (0.97–1.80)</td>
<td>1.40 (1.01–1.92)</td>
<td>1.24 (1.01–1.50)</td>
</tr>
<tr>
<td>Low job satisfaction</td>
<td>1.11 (0.95–1.30)</td>
<td>1.19 (1.03–1.38)</td>
<td>1.59 (1.29–1.97)</td>
<td>1.28 (1.13–1.45)</td>
</tr>
<tr>
<td>High job strain</td>
<td>1.43 (1.25–1.62)</td>
<td>1.09 (0.85–1.39)</td>
<td>1.40 (1.10–1.80)</td>
<td>1.35 (1.22–1.50)</td>
</tr>
<tr>
<td>High job insecurity</td>
<td>–</td>
<td>–</td>
<td>0.85 (0.43–1.69)</td>
<td>1.12 (0.87–1.45)</td>
</tr>
<tr>
<td>Stressful work</td>
<td>–</td>
<td>1.56 (0.57–4.23)</td>
<td>1.22 (0.96–1.55)</td>
<td>1.15 (0.94–1.40)</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>1.27 (0.85–1.90)</td>
<td>1.71 (1.31–2.23)</td>
<td>1.40 (0.73–2.66)</td>
<td>1.46 (1.19–1.78)</td>
</tr>
</tbody>
</table>

Note: Bold type indicates statistically significant results ($p < .05$).
Impact of organizational and psychosocial factors at work on MSDs

Work-related risk factors for specific shoulder disorders: a systematic review and meta-analysis

Table 3  Quality of the evidence for the relationship between risk factors and specific soft tissue shoulder disorders according to the GRADE framework

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Number of participants</th>
<th>Number of cases</th>
<th>Number of studies</th>
<th>Phase of investigation 1=exploratory, 2/3=explanatory</th>
<th>Study limitations</th>
<th>Inconsistency I²&gt;50% or one study: ↓</th>
<th>Indirectness Yes: ↓</th>
<th>Imprecision CI effect size (&lt;1 and &gt;2, range &gt;2) Yes: ↓</th>
<th>Publication bias Yes or unclear: ↓</th>
<th>Effect size OR (95% CI) Lower limit OR &gt;2.0: ↑</th>
<th>Exposure-response gradient (dose effect) Majority of studies: ↑</th>
<th>Overall quality of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force exertion</td>
<td>2,412,945</td>
<td>16,199</td>
<td>5</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>66%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.53 (1.25 to 1.87)</td>
<td>2/5</td>
<td>Low</td>
</tr>
<tr>
<td>Arm elevation</td>
<td>2,400,231</td>
<td>14,844</td>
<td>4</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>50%</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.91 (1.47 to 2.47)</td>
<td>2/4</td>
<td>Moderate</td>
</tr>
<tr>
<td>Repetition</td>
<td>2,410,706</td>
<td>15,620</td>
<td>3</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>95%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.42 (0.91 to 2.22)</td>
<td>1/3</td>
<td>Low</td>
</tr>
<tr>
<td>Shoulder load</td>
<td>2,397,992</td>
<td>14,265</td>
<td>2</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>0%</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>2.00 (1.90 to 2.10)</td>
<td>1/2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hand-arm vibration</td>
<td>2,387,952</td>
<td>15,973</td>
<td>4</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>99%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.34 (1.21 to 1.77)</td>
<td>1/4</td>
<td>Low</td>
</tr>
<tr>
<td>Job demands</td>
<td>50,841</td>
<td>1,996</td>
<td>3</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>62%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.12 (1.01 to 1.25)</td>
<td>0/3</td>
<td>Low</td>
</tr>
<tr>
<td>Social support</td>
<td>38,966</td>
<td>692</td>
<td>3</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>61%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.05 (0.83 to 1.33)</td>
<td>0/3</td>
<td>Low</td>
</tr>
<tr>
<td>Decision latitude</td>
<td>13,439</td>
<td>1,439</td>
<td>2</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>84%↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.08 (0.89 to 1.31)</td>
<td>0/2</td>
<td>Low</td>
</tr>
<tr>
<td>Job control</td>
<td>37,402</td>
<td>557</td>
<td>1</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>One study↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.22 (1.00 to 1.50)</td>
<td>0/1</td>
<td>Low</td>
</tr>
<tr>
<td>Job security</td>
<td>725</td>
<td>84</td>
<td>1</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>One study↓</td>
<td>No</td>
<td>No</td>
<td>Unclear↓</td>
<td>1.12 (0.93 to 1.36)</td>
<td>0/1</td>
<td>Low</td>
</tr>
<tr>
<td>Work with temporary workers</td>
<td>614</td>
<td>45</td>
<td>1</td>
<td>2</td>
<td>Lower ‘risk of bias’</td>
<td>One study↓</td>
<td>No</td>
<td>Yes</td>
<td>Unclear↓</td>
<td>2.2 (1.2 to 4.2)</td>
<td>0/1</td>
<td>Very low</td>
</tr>
</tbody>
</table>

GRADE: Grades of Recommendation, Assessment, Development and Evaluation
↓ signifies a downgrade of quality of the evidence; ↑ signifies an upgrade of quality of the evidence.

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Risk Factors for Shoulder Pain in the Cosali cohort: A Structural Equation Model

![Diagram showing physical factors and their relationships with other factors like age, BMI, psychological demand, and decision authority.]

- Work pace dependent on automatic rate
- Work pace dependent on customers’ demand

Replication of the model:
- Carpal tunnel syndrome: Roquelaure et al. Pain 2020;161:749-57

FACTORS
- Organizational
- Psychosocial
- Physical
- Personal
Impact of organizational and psychosocial factors at work on MSDs

- Ergonomic knowledge: counterproductive effects of temporary work

1. Skills and know-how of experienced workers not officially recognized
2. Temporary workers without sufficient skills and know-how to cope with the complex task
3. Productivity loss
4. Increased work demand for experienced workers
5. Increased absenteeism of experienced workers
6. Experienced workers replaced by temporary workers

From Franchi et al, Anact (1995)

French COSALI cohort: increased risk of Rotator cuff syndrome and CTS for workers in temporary work and those working with colleagues in temporary work (Bodin et al SJWEH 2012; Rigouin et al IAOEH 2013; Petit et al Appl Ergon 2015)
Theoretical framework of work-related MSDs

- Individual factors
  - Factors of susceptibility (-)
    - Ageing
    - Health behavior (+/-)
    - Medical status
    - Psychological status
  - Factors of resilience (+)
    - Knowledge, skills and values
    - Working strategies
    - Capabilities (A. Sen)

- Sociodemographic and Individual factors

- Physical factors

- Organisational and Psychosocial factors
  - Organisation of work
  - Preventive measures

- Work-related MSDs
  - Self-reported MSDs
    - Back, upper limbs and lower limbs
  - Diagnosed MSDs

- Accidents at work

- Impacts of MSDs
  - Health outcomes
    - Physical health (comorbidities)
    - Mental health
    - Public health costs
  - Employment
    - Presenteeism
    - Absenteeism
    - Return to work
    - Future career paths
  - Work
    - Quality
    - Productivity
Implications for MSD prevention

- MSDs are characterized by a cluster of causes rather than a single cause
- Bio-psycho-social (individual) case management MSDs
- Bio-psycho-social and organizational collective MSD prevention
  - Move beyond a technocentric approach to adopt an ergonomic perspective
  - Question the companies’ productive, organizational and management models

  – Multifactorial interventions
    - Hierarchical and global approach of risk assessment
    - Target different levels (micro, meso and macro) of the chain of determinants
    - Integrated collective prevention strategy (‘primary’, ‘secondary’, ‘tertiary’ levels)

  – Promotion of more sustainable and socially responsible production models
    - Incorporation of social and health impacts into economic and managerial models
    - Spirit of social justice enshrined in the 1944 Declaration of Philadelphia (International Labor Organization)
Gaps of knowledge (1)

• **Conceptual model**
  – Interrelationships between MSDs and psychosocial and organizational factors at work
  – Identification of levers for long-term MSD prevention

• **Epidemiological research**
  – Longitudinal studies
  – Various psychosocial models
    • e.g., job strain, effort-reward imbalance, organizational justice, …
  – ‘New’ psychosocial factors at work
    • e.g., emotional demand, conflict of values, …
  – Forms of work organization
    • e.g., platform work, teleworking, …
  – Forms of employment
    • e.g., fixed-term and temporary work, involuntary part-time, variable hours contracts, self-employment, …
Gaps of knowledge (2)

• Interventional research
  – Organizational and psychosocial work factors are not well integrated into MSD prevention programs

• Interventional models
  • Multifactorial interventions
  • Work organization interventions
  • Strategies of Integrated prevention
  • ...

• Participatory process
  – Participatory ergonomics
  – Intervention mapping

– Implementation, efficiency and sustainability of intervention
  • Barriers and facilitators
  • Acceptability, feasibility

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Thank you for your attention!

Yves Roquelaure

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