Healthy Workplaces Campaign 2020-22
LIGHTEN THE LOAD

PSYCHOSOCIAL RISK FACTORS FOR WORK-RELATED MSDs IN THE CONTEXT OF NEW FORMS OF WORK AND DIGITALISATION

Prof Yves Roquelaure (University of Angers, France)
Digitalisation and new forms of work (1)

- Complex and multifaced phenomenon covering a wide range of jobs and working conditions

- Three major components (Bérastégui, 2021; Degryse, 2017)
  - Robotisation (in all its forms) to carry out non-routine manual and cognitive tasks
    - Material: smart factories, 3D printers, driverless vehicles, etc.
    - Virtual: software, algorithms, production process management and control, artificial intelligence
  - New business model: the “online-platform economy”
    - Big data: merging of colossal masses of data
    - Omnipresent access to digital platforms (network, on-demand physical service, commercial services)
    - Online outsourcing of “microwork” / low-qualified crowd workers (e.g., Amazon Mechanical Turk)
    - Online freelancing of high-qualified self-employed workers (e.g., translators, Upwork)
  - New (flexible) forms of work and new types of workers
    - Platform work representing ~3-5% of the workforce, but growing fast (Huws, 2020)
    - Crowd workers available 24/7 almost everywhere
    - Flexible employment (part time, self-employed, employees sharing, collaborative employment, etc.)
Digitalisation and new forms of work (2)

- **Social and health inequalities in the working population in the UE** (McKinsey Global Institute, 2020)
  - 22% of current work activities could be automated by 2030 (~ 53 million jobs)
  - 50% of workforce will face job transitions requiring the acquisition of new skills
  - (+) major gains in higher-skilled jobs / (-) significant losses in medium-skilled jobs
  - Workforce more diverse, dispersed and precarious, with frequently changing jobs

- ± optimistic / pessimistic scenarios for 2025 (EU-OSHA)
Covid-19 pandemic: a booster of the digital economy?

- **Strong impact on the European labour markets** (Living, working and COVID-19 e-survey, May 2020):
  - 8% (*salaried employees*) and 13% (*self-employed*) became unemployed
  - Young workers, women, low/medium-skilled workers, the self-employed and platform workers

- **Acceleration of the transition of work toward online or virtual environments**: 
  - Teleworking jumped up to 40% in the UE (April 2020)
  - Expansion of e-communications (*e.g.*, Zoom videoconferencing)
  - ‘New experience’ of work from home will durably change perspectives on remote/virtual work

- **Major OSH consequences**
  - Higher levels of psychosocial distress (*Home-based telework and virtual teamwork*)
  - Increased work intensity (*“essential”* or *“life-sustaining”* workers and higher-skilled services workers)
Organizational and psychosocial factors at work and WRMSDs

- **Multi-level conceptual model** (Roquelaure, 2016, EU-OSHA, 2020)
  - **Macro level**: economic, social, and political environments
  - **Meso level**: organization of production and management practices at the production unit level
  - **Micro level**: individual work situation level

- **Work organization, management and HR practices**:  
  - **Domino effects** on exposure to work-related biomechanical and psychosocial factors  
    → Changes following the spread of digitalisation and new forms of work  
    → Major positive/negative effects on the risk of WR-MSDs depending on the context
Digitalisation and new forms of work: two risk models for WR-MSDs

1. Low-level sustained static work
   • Soft-tissues “underuse”
   • Biomechanical factors (+)
     – Prolonged constrained posture
     – Sitting posture
   • Psychosocial factors (+++)  
   • Non-specific MSDs
     – Chronic muscular pain
     – Neck/shoulders and back (+++)
   • Overexposed workers
     – “Cognitive” workers (+++)
     – Visually demanding tasks
     – New forms of sedentary work

2. High-level dynamic work
   • Soft-tissues “overuse”
   • Biomechanical factors (+++)
     – Repetitive / forceful movements
     – Posture / Vibration
   • Psychosocial factors (+/-)
   • Non- and specific MSDs
     – Muscular pain
     – Tendinopathies, nerve entrapments
   • Overexposed occupations
     – “Manual” workers (+++)
     – Physically demanding tasks
Contrasted impact on biomechanical risk factors for WR-MSDs

• **↓ strenuous physical work and ergonomic hazards** (EU-OHSA, 2021)
  - Robots
  - Cobots
  - Exoskeletons

• **↓ High-level dynamic work**
  - high forces, repetitive movements
  - overhead work, awkward postures

• **Reduction will probably be unequally applied across work situations**
  - e.g., lot size manufacturing, voice picking, etc.,

• **↑ sedentary work**
  - On-screen control and monitoring activities
    - production sector (smart factories, etc.)
    - online services platforms
  - Teleworking and work at home: **↑** time spent in sitting posture (Oakman et al., 2020)

• **↑ Low-level sustained static work**
  - trunk, neck and upper-limbs

• **Reduced level of daily exercise and energy expenditure**
Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- The new forms of work and digitalisation reinforce the current shifts in patterns of exposure to workplace hazards in the UE

- Counterbalance the expected reduction of the physical workload?
  - ↑task repetitiveness, cognitive workload, and psychosocial demands
  - Permanent electronic monitoring of workers’ performance
  - Algorithmic human resources management

- Increased exposure to the main organisational and psychosocial risk factors for WR-MSDS
  - Intensity of work
  - Autonomy and job control
  - Quality of the social relations at work
  - Job insecurity
  - Emotional demands at work
  - Working time - boundaries between work and personal life
Contrasted impact on risk factors for WR-MSDs: psychosocial factors

**Work intensity**

- **Digital economy will further the work intensification observed in Europe** (EU-OSHA, 2019)

- **High psychological demand and “technostress”** (Berg-Beckhoff et al, 2017)
  - ICT-mobile (tele)workers: greater work intensity and level of stress (41% vs 25%) (2015EWCS)
  - Digitally-induced work intensification mediates negative mental effects rather than use of ICT per se (Borle et al., 2020)

- **Major Influence of the job content** (Degryse, 2016; EU-OSHA, 2018; McKinsey Global Institute, 2020)
  - Highly mentally demanding creative high-tech jobs with a large autonomy (highly qualified workers)
  - Physically- and mentally demanding monotonous repetitive jobs devoid of operational leeway (low qualified workers, crowd platform workers) and at high risk of WR-MSDs
Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- **Autonomy and job control**
  
  • Digitalisation may either reinforce or diminish workers’ autonomy depending on ergonomic design, management practices and implementations strategies
    - Mobile (tele)workers: greater autonomy at work and working time autonomy (2015EWCS)
    - Platform workers: limited autonomy because of the algorithmic management and permanent controls (De Groen, 2018)
  
  • “Paradoxical autonomy”: greater independence provided by digital technologies or feeling to be obliged working everywhere or all the time? (Borle et al., 2020)
  
  • New forms of “Digital Taylorism”: collaborative robots with automated decision-making influencing assembly line workers might reintroduce old Taylorian management principles (e.g., agile “lot size manufacturing”)
Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- Quality of the social relations at work

  • Automation and algorithmic management will increase the number of people working remotely, often individually without contact with colleagues or in competition with them.

  • Fulltime teleworking may lead to physical and social isolation, reducing social interactions at work, either with colleagues or managers → ‘Job iso-strain’ situations at risk of WRMSDs.

  • Lack of information on how algorithms work may affect workers’ sentiments of organisational justice.

  • Unfair pay and procedure inconsistencies may reinforce the feeling of effort/reward imbalance.
Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- **↑ Job insecurity**
  - Diversity and precariousness of employment forms

- **↑ Emotional demands at work**
  - Permanent surveillance and/or public evaluation (platform work, telework)
  - Unfair and conflictual relationships with customers and requesters (on-demand physical services workers, e.g., *Uber or Deliveroo*) *(Bérastégui, 2021)*

- **↑ Working time - blurred boundaries between work and personal life**
  - ICT-mobile workers or home-based teleworker *(2015EWCS, Oakman, 2020)*
  - Voluntary nature and informal agreement between employees and managers?
Resulting impact of digitalisation on the risk of WR-MSDs will depend on the jobs and contextual factors at several levels

**Top jobs in the digital economy** (Degryse, 2016)
- Data analysts, data miners, data architects
- Software and application developers
- Specialists in networking, artificial intelligence, etc.
- Designers and producers of new intelligent machines, robots and 3D printers
- Digital marketing and e-commerce specialists

**Digital ‘galley slaves’**
- Data entry or filter workers
- ‘Mechanical Turks’ working on the digital platforms
- Uber drivers,
- Collaborative casual odd-jobbing

**Macro level**
- Sectors and occupations
- Socioeconomic position
- Forms of employment
- Digital technologies
- ...

**Meso level**
- Specific management context
- Autonomy given to the workers
- Implementation strategies
- ...

**Micro level**
- Ergonomics of the workstation
- Training
- Individual characteristics
- ...
To conclude:

- Digitalisation will bring new and emerging OSH challenges, but also opportunities depending on how the technologies will be implemented, managed and regulated.

- One of the key challenges for research and prevention will be keeping at pace with the fast development of digital technologies and new forms of work.

- Surveillance, risk assessment and OSH policies should be adapted to more flexible working patterns and forms of employment.
Thanks!

Questions?

Your feedback and ideas are welcome!

Yves.roquelaure@univ-angers.fr
http://www.ester.univ-angers.fr/