Identification and prioritization of relevant prevention issues for work-related musculoskeletal disorders (MSDs)

Work Package 4

Prevention approaches

Defizites and needs
Research activities and intervention strategies
Part I
Evidence-based intervention effects

Part II
Prioritized intervention and research strategies from international expert’s point of view
Methods part I: Included publications

**Journals, peer-reviewed**
- Systematic search in 2 databases
  - MEDLINE, PSYCINFO

**Gray publications of engaged institutions (internet)**
- **Work & Health Institute**, Canada
  - Several systematic reviews
- **OSHA**, EU
- **IGA (Initiative Health and Work)**, Germany

**German OSH research databases**
- Federal Ministry of Labour and Social Affairs and of the
- Social Accident Insurance (DGUV)
Inclusion criterias (databases)

Evidence-based approach
gold standard: RCT
- Systemat reviews, reports (meta-reviews), empirical meta-analysis studies
- No single studies
- No single professions

Selection criterias
- language English/German
- culture EU, USA/CAN/AUS (not: Asia, Africa)
- publication period 2000 - spring 2009
Prevention categories

Primary prevention (PP)
(a) Behavioural prevention
(b) Situational prevention
(c) Risk assessment

Secondary prevention (SP)
Health surveillance
(occupational medicine)

Tertiary prevention (TP)
Return-to-work programs
- in the clinical and occupational setting
- in the occupational setting
( German „Company Reintegration Management“)
Search results

Primary prevention (n= 21)
- 15 systematic reviews + 4 reports + 2 meta-analysis studies

Tertiary prevention (n= 16)
- 11 systematic reviews + 5 reports

Secondary prevention (n= 2)
- 0 systematic reviews with close relationship to the topic
- 2 systematic reviews discussing the flag-system for screening

Various ...
- specifications/definitions/combinations of body localization

Carpal tunnel syndrome, low back pain, neck pain, upper/lower extremeties, MSDs...
# Review quality: AMSTAR checklist (used for primary prevention publications)

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The AMSTAR quality mean value ± std.dev. is 0.73 ± 0.12 (range from 0.50 to 0.91).

Shea et al. (2007) AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC Medical Research Methodology 2007; 7:10
Results
Evidence for effects on MSD-outcomes?

Primary prevention (PP)
(a) Behavioural prevention
(b) Situational prevention
(c) Risk assessment

Prevalence / incidence / recurrence rate of symptoms, pain intensity, discomfort injuries sick leave
Results: (a) Primary behavioural prevention

Strong evidence for *missing* effects

- Education (instructions, back school, guidelines)
- Protection equipment (lumbar supports, wrist splints)

“Several, high-quality RCTs with consistent findings”

- Sufficient sample size
- Adequate and “true“ control groups
- Appropriate outcome measurement
- Control of confounder variables
- Proper documentation of design / intervention processes
Results: (a) Primary behavioural prevention

Moderate evidence for missing effects
- Training of risk-reducing working techniques (manual handling)

Limited to no evidence for any effect
- Modification of individual risk factors (overweight)

Strong to moderate evidence for positive effects
- Exercises (muscle strengthening, fitness)
Results: (b) Primary situational prevention

Overall, *inconclusive* evidence for positive effects

- Technical workplace measures
  - (tools, e.g. lifting equipment, ergonomic computer devices)

But: *strong* evidence for positive effects

- on *load reduction*, if evaluated!

*Limited* evidence for positive effects

- Workplace modification
  - work re-organization, organizational development
    - (job enrichment, participative work(place) design, leadership ability improvement, expert “task force”)
Results: Multidimensional approaches

Moderate evidence for positive effects
Multidimensional approaches
= combination of
  - technical AND
  - behavioural AND
  - work organizational measures

Reported results apply to single measures!

Promising!
Results: (c) Risk assessment

a) Workplace risk assessment by OHS experts
   - No reviews/ studies found → research need!

b) Health assessment
   - 1 syst. review (Waddell & Burton 2001): To match physical capability to job demands
     Limited/contradictory evidence → research need!

Need for further high quality research!
But: limitations when screening is voluntary
Conclusions: Primary prevention

Single measures
- Results for general MSD outcomes not very positive, exception: exercises
- Economic studies are scarce!

Multi-dimensional approaches
- Promising, but further - good studies – needed

Evidence based assessment approach
- **Caution**: Missing evidence ≠ missing effects, but too few good studies
- Some authors criticize application of this strict approach
- More positive effects reported, inclusion of e.g. more experimental studies recommended
Results
Evidence for effects on MSD-outcomes?

Secondary prevention by occupational physicians

Health surveillance of workers at risk (high MSD-workplace exposure, chronic MSDs)
Results: Health surveillance

- No *specific* reviews found
- **Screening** by „4-flag-system” (acute low back pain: risk of chronification and early intervention)
  - “Red flags”: individual **physiological** risk factors
    - (e.g. persistent severe restriction of lumbar flexion, structural deformity)
  - “Yellow flags”: **psychomental** risk factors
    - (e.g. negative attitudes or beliefs about pain)
  - “Blue flags”: **high job requirements**
    - (e.g. high demands, poor social support)
  - “Black flags”: objective **workplace** risk factors
    - (e.g. high biomechanical demands)

??? Needs for further research !!!
Results: Tertiary prevention (TP)
Evidence for effects on MSD-outcomes?

--- Low back pain ---

*Strong* evidence for positive effects
- exercises
- behavioral treatment

*Moderate* evidence for positive effects
- modified work
- intensive back schools
- multidisciplinary return-to-work approaches
- work(place) modification
- work hardening (training)
- behavioural therapy to modify pain processing
Results: TP

--- Upper extremeties ---

*Limited to moderate* evidence for positive effects
- technical or mechanical interventions
  * (depending on intervention type)

*Insufficient/ limited* evidence for positive effects
- psychosocial interventions (organizational changes)
- exercises
- multidisciplinary treatment

--- Lower extremeties ---

*no* evidence for any effects of any interventions
Conclusions
Secondary / tertiary prevention

Research deficits in the field of
- screening and surveillance of
  workers and workplaces at risk
- upper extremity disorders
- lower extremity disorders

Promising
- multidisciplinary return-to work approaches
Part II
Prioritized intervention and research strategies from international experts' point of view

Part I
Evidence-based intervention effects

Expertises
Conference reports
Sources: a) Expert group publications

**BAuA, Germany**
- Nolting et al. / Bruder et al. 2007: Expertises: Innovative and integrative prevention approaches

**NORA (Nat. Occupational Research Agenda, NIOSH, USA)**
- Recommendations for further action and research (8 occup. sectors)

**Work Safe Australia**
- National strategies and recommendations for further action and research
Sources: b) MSD conferences

EUROFOND „Musculoskeletal disorders & organisational change“
Lisbon 2007
- European Foundation for the Improvement of Living and Working Condition www.iwh.on.ca

PREMUS „Prevention of work-related musculoskeletal disorders“
Boston, 2007

ANNAPOLIS MSD-Conference (upper extremity disorders)
USA, 2005
Concluded recommendations
More action for target groups with...

a) ... high exposure to certain demands:

- **forced postures**
  in standing, bending, kneeling or overhead positions

- **high and/or low level static exertions**
  especially combined with mental demands

- **psychosocial risk factors/stress**

- **repetitive work**
  with lack of recovery

- **manual work load**
b) ...certain industrial sectors: focus on...

- In general: **SMEs** (small and medium sized enterprises)

- More detailed: services, esp. hotel/ gastronomy, retail trade

- Sectors with **high physical load**
  e.g., construction, manufacture, transportation/ distribution, health services/nurses, agriculture/ forestry/ fishing

- Sectors with **static load** (e.g., computer user).
Concluded recommendations
More action for target groups…

c) **Individual risk predisposition: focus on…**

- **Older workers**, especially in highly demanding professions (high loads, long duration of forced postures, psychomental demands)

- Employees with **overweight** and other important functional impairment risks often correlated with MSDs, e.g. metabolic syndrome
d) Higher risk for certain MSDs, focus on…

- **Upper extremities**
  especially shoulder disorders

- **Lower extremities**
  especially knee disorders

Besides back disorders!
Concluded recommendations
More interventions / evaluation …

a) Prevention type

- **Screening / surveillance followed by early intervention**
  (OHS experts)

- **Risk assessment**
  including development / dissemination of applicable tools for employers

- **Organizational changes**
  in the enterprise

- **Return-to work programs**
  work-related, as described before

!!! Always multi-dimensional / multidisciplinary !!!
Concluded recommendations
National/political strategies

a) Focus on more efforts to help employers

- **Networking** of social partners / insurances
  - !!! Return-to-work programs and
  - !!! to address and integrate SMEs in prevention issues

- Development and provision of **information registers**

- **Incentives** to encourage employers for taking part in preventive measures

- **(More) guidelines** for successful intervention strategies
- **Evaluation routines** for preventive measures
- Innovative ways to **reach employers**
Concluded recommendations
Research efforts

a) Design: focus on…

- **High-quality study design**
  Calculation of study power analysis & effect sizes
  Use of concurrent control groups
  (Cluster-) randomized controlled trials
  Long-time follow ups (> 12 months).

- **Adequate outcome evaluation**
  Consideration of confounding predictors / “intermediate” variables
  Evaluation of economic outcomes
Thank you for your attention!

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