Manual work and musculoskeletal disorders

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What shall we learn today?

- Safety first, but health follows closely after
- Musculoskeletal disorders
 - are very common all over the world
 - can have serious consequences
- Risk factors for work-related musculoskeletal disorders
 - biomechanical and psychosocial
- Reducing risk factors: assistive devices, variation, breaks



General hierarchy

Occupational Health - improvement

Occupational Health - prevention

Occupational Safety



Safety first





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OSH Pro Services

Musculoskeletal disorders - general population

- Highest burden of disease
 - Lower back leading cause of years lived with disabilities, also in Kenya (Global Burden of Disease 2017)
 - Global prevalence lower back pain in 2017: 37% (Safiri, et al 2021)
- Life-time prevalence: 58-84% (Woolf AD & Pfleger B, 2003)

• Musculoskeletal pain increases with age (Woolf AD & Pfleger B, 2003)



Consequences of musculoskeletal disorders

- Reduced work capacity
 - Can still work, but not as much or with different tasks
- Sick leave and disability
 - Can temporarily not work, or can permanently not work

- Reduced/no income
- Reduced mental health, less social support through work



Work-related musculoskeletal disorders – a definition

Definition:

Work-related musculoskeletal disorders are pain rising from the **<u>musculoskeletal system</u>**, from muscles, joints, tendons, ligaments that are either <u>caused by</u> or <u>aggrevated by</u> the working environment (WHO,1985)







Prevalence of work-related musculoskeletal disorders is highest among manual workers

Figure 4. Estimated prevalence rates of self-reported WRMSDs in Great Britain, for people working in the last 12 months, by occupation, averaged 2017/18-2019/20



HSE (2020)



Musculoskeletal disorders are prevalent in Kenya

- Nurses (Kenyatta National Hospital, Mombasa County hospitals):
 - Any body region: 74-77%
 - back (32-77%), feet (22-48%), neck/shoulders (20-53%) (Mailutha et al., 2020; Tanui, 2015)
- Primary school teachers (Machakos County)
 - Any body region: 85%
 - back (59%), knees (58%), neck (53%) (Ndonye et al., 2019)
- Flower farm workers
 - Any body region: 68%
 - back (38%), wrist & hand (24%), ankle & feet (24%) (Manula et al., 2021)





Model for work-related risk factors of musculoskeletal disorders:



Biomechanical work load



F = frequency, A = angle, C = coupling, D = distance, V = vertical dist., H = horiz. dist., AM = asymmetric multiplier

Canadian Center for Occupational Health and Safety





Classical mechanical risk factors

Standing work

Repetative work



Manual handling

Awkward postures



How to quantify risk factors

• Does the worker have the risk factor (yes/no)

- Intensity how much
- Duration how long
- Frequency how often



Knowledge status







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Risk factors for lower back pain

- Prolonged standing (>4hrs per day) (Coenen et al., 2018)
- Manual handling, usually with force use (STAMI report, 2017)
- Forward bending / rotation / side bending, especially combined with lifting

(STAMI report, 2017)





Risk factors for pain in the upper extremities



- Neck, shoulder, and arm
 - Repetative work, with force use
 - Manual handling, with force use (STAMI report, 2017)
- Neck
 - Neck flexion, >20 degrees
 (Norasi et al., 2021)
- Shoulder
 - Working with elbows over shoulder height (STAMI report, 2017; Wærstedt et al., 2020)



Risk factors for pain in the lower extremities



- Hip and knee arthorosis
 - Manual handling

(STAMI report, 2017)

- Knee arthorosis
 - Life time of squatting/kneeling
 (STAMI report, 2017)
- Pain lower extremities
 - may be related to prolonged standing (>4h per day)

(Coenen et al., 2018)



Increased risk of increased pain when exposures are combined



E.g. low back pain

- Standing
- Heavy lifting
- Forward bent posture with rotation
- Manual handling

Anders et al. (2021)



Cumulative exposure

- Lifting >1000 kg per day
- Lifting >20 kg more than 10x per day

With every decade worked, risk increases for sick leave

Lifting >20 kg more than 10x per day
 With every decade worked, risk increases for disability pensioning

Sunstrup et al. (2017)





Psychosocial work-related risk factors

- Psychological risk factors
 - E.g. growth and development
- Social risk factors
 - E.g. supportive leaders/colleagues
- Organisational risk factors
 - E.g. work load management





Psychosocial risk factors for musculoskeletal disorders

- High job demands
- High job strain (high job demands/low job control)
- High effort/reward-imbalance
- Low social support





Psychosocial factors can contribute towards chronic pain





What can we do?

- Reduce risk factors
 - -Use assistive devices to reduce load
- Ensure variation and enough breaks for recovery
- Organise and facalitate for work tasks

BUT – How and how much?
 – We need more knowledge



Risk assessment tool - RAMP

KTH		
and the second sec		Search the KTH website
		Search
Ergonomics / RAMP /	About RAMP	Denna sida på svensk
RAMP		About RAMP
Start		
About RAMP	~	RAMP is a tool to support the assessment and management of Musculoskeletal disorder (MSD) risks in manual handling jobs. It is research based and has been developed in
About RAMP		Sweden, in close co-operation between researchers at KTH Royal Institute of Technology
The Programs		and practitioners at companies in a project financed mainly by AFA Insurance and the
The Modules		participating companies.
Download	>	RAMP consists of four modules:
User Manual		• The checklist-based RAMP I for screening of MSD risks
PDF versions		• <i>RAMP II</i> which enables a more in depth analysis
Publications	>	 The Results module for presenting, visualising and communicating the results The Action module, supporting the development of risk reducing measures and

https://www.ramp.proj.kth.se/about-ramp



Conclusions

- Risk factors for musculoskeletal disorders:
 - individual biomechanical risk factors, especially over time
 - Standing, repetative work, manual handling, awkward postures
 - combined biomechanical risk factors
 - psychosocial risk factors
- Important to prevent musculoskeletal disorders
 - Reduce load, increase variation and breaks, organise and facilitate for work tasks, use assistive devices



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Risk factors are not necessarily causes

Cause \rightarrow one thing leads to another We are most interested in **cause**, because we can do something about it.

Risk factor \rightarrow increases the incidence/prevalence of an outcome *Often not enough knowledge to identify cause, so we talk about risk factors*

E.g. age and gender as a risk factors for musculoskeletal disorders



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