Back pain: prevention and management in the workplace

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Who am I?

Frederieke Schaafsma
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46 years old
1 Prevention of back pain in the workplace
   1.1 What are the work-related risk factors?
   1.2 What are effective interventions?

2 Management of back pain in the workplace
   2.1 What are the risk factors for sickness absence?
   2.2 What are effective interventions?

3 Recommendation for future research
What is back pain?
Burden of back pain

Out of all 291 conditions studied in the Global Burden of Disease 2010 Study

- LBP ranked highest in terms of disability (YLDs), and sixth in terms of overall burden (DALYs)
- The global point prevalence of LBP was 9.4%
- DALYs increased from 58 million in 1990 to 83 million in 2010
- Prevalence and burden increase with age

YLD= years lived with disability
DALY= disability adjusted life years

Source: Hoy et al. 2014
High costs due to productivity loss:

- Less productive
- Sickness absence
- Work disability → personal income down / income taxation revenue for government
- Exit labour market → personal income down / government benefit payments for retired workers

But also due to health care costs...
Paradigm change of course LBP

From acute, sub-acute and chronic back pain to ...

→ A more chronic or recurrent condition.

A truly ‘initial’ episode of LBP is rare in adults...

→ four distinct clusters, each representing a different course of low back pain

- persistent but mild
- recovering
- severe and chronic
- fluctuating

Source: Pransky et al. 2010
The overall population attributable fraction was **26%**, varying considerably with age, sex and region.

- the largest numbers were in persons aged 35-55 years.

- The highest relative risk (3.7) was in the agricultural sector.

Source: Driscoll 2014

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1.1 Work related risk factors for incident LBP
What work related risk factors?

Many older reviews showed evidence of a relation between incidence of LBP and physical factors from the workplace:

- Lifting
- Manual material handling or patient handling
- Physical work
- Whole body vibration
- Static working posture
- Standing, walking, prolonged sitting

Kwon et al. 2011 in Occupational Medicine:

“None of the occupational physical activities examined (i.e. bending/twisting, awkward postures, sitting, standing/walking, carrying, pushing/pulling, lifting and manual handling/assisting patients) had strong evidence to support a causal relationship with LBP”.

→ Series of 8 systematic reviews concluded that none of the work-related physical factors were causally related to LBP

→ Dispute in literature......

- Work-related physical factors such as manual lifting and whole body vibration are a risk factor, however effect sizes are small..
- For walking, standing and sitting at work; there is reason for debate
In a health impact assessment, the effects of the pooled exposure–response relationships on LBP incidence was assessed.

8 longitudinal studies were included. For each study, an exposure–response relationship was calculated. Pooled risk estimates, were calculated for the effect of
- **frequency** (expressed in 10 lifts per day), and
- **intensity** (expressed in 10 kg of lifting)

of lifting on LBP.

Duration of lifting could not be pooled.
Associations of lifting intensity (upper part of the figure) and lifting frequency (lower part of the figure) and the incidence of low back pain.

It was estimated that lifting loads over 25 kg and lifting at a frequency of over 25 lifts/day will increase the annual incidence of LBP by 4.32% and 3.50%, respectively, compared to the incidence of not being exposed to lifting.

→ Intensity and frequency of lifting significantly predict the occurrence of LBP.
Psychosocial factors probably not the direct cause for incident LBP

but will indirectly contribute through associated increases in exposure to work-related physical factors or changes in the perception of and response to symptoms.

Psychosocial factors may be an important factor for diminished recovery of LBP or for sickness absence due to LBP

Factors such as:
- High work strain or low job control (model of Karasek)
- Low co-worker support
- Low support from supervisor
So, what causes back pain?

There is a multifactorial cause of back pain, with genetic, biological and environmental factors.
1.b What are effective interventions to prevent LBP?

NIOSH recommendations about:
- Maximum weight limit (23 kg) and lifting conditions such as horizontal and vertical distance of the load from the body and degree of trunk rotation

→ Effectiveness has not (yet) been evaluated!
Whole body vibrations

- Limits for exposure to whole body vibrations
- Exposure during an eight hour work day beyond:
  - an intensity of 0.25 m/s² is considered potentially dangerous
  - an intensity 0.50 m/s², it is required to take action to remediate the danger of exposure.

- There are some studies that have evaluated the effectiveness of measures to reduce whole body vibration when exposure was above the standard, but they could not show a decrease in exposure (low compliance)

Source: Tiemessen et al. 2009
Focus on organisational ergonomics
Focus on physical ergonomics of the workplace

However, not yet proven to be effective in preventing LBP...

Focus on implementing ergonomic measures in the workplace using participatory ergonomics programme
Participatory approach

Often....

Most implemented measures more simple and less expensive ones; “Low hanging fruit”, difficult to show an effect on the prevention of LBP (Driessen et al. 2011)

However, an overview of 52 studies evaluating the participatory approach on organisational level showed that there was a positive effect on:

- Improve (determinants of) health behaviour
- Reduce MSH (majority LBP) symptoms
- Reduce sickness absence due to MSH (majority LBP) symptoms

But for preventing incidence of LBP this has not yet been established!
Advice for the individual worker

- Physical exercise (back and abdominal muscles) probably helps to prevent LBP

- However, the effect of back schools, educational programmes etc.
  - large variety in type and intensity,
  - difficult to achieve long lasting change in behaviour

- Pre-employment screening: contradictory results: probably only effective for very specific jobs with particular physical demands
How about advice on manual material handling?

Training on proper lifting techniques and the use of mechanical aides (assistive devices) are considered important techniques to prevent back pain....

However, not effective!

Source: Verbeek et al. 2011
2. Management of back pain

What clinicians should do (based on EB guidelines):

- Differentiate in an early stage between non-specific LBP, and specific LBP
- Watchful waiting (stimulating being active)
- Manipulative / exercise therapy/ paracetamol/ NSAID’s
- Work related risk factors?

If this does not work....... 

- Individual physiotherapy
If it still does not work?

..... Multidisciplinary approach also involving psychosocial aspects (yellow flags) of the LBP

→ Stepped care approach!
Still high number of people with LBP are referred for diagnostic imaging or specialist treatment...

→ Risk of medicalization, chronicity, work disability

And, many patients with LBP report poor collaboration between health care providers
Dutch guideline for LBP

Multidisciplinary guideline for non-specific low back pain (Netherlands, 2010)

Focus on:

- Multidisciplinary communication & collaboration
- Patient-doctor communication
- Patient activation & return to work

➔ Stepwise approach
➔ Decrease health care utility (consultations & imaging referrals)

PROBLEM WITH IMPLEMENTATION OF THE GUIDELINE IN DAILY PRACTICE!
Reassurance does not work for all LBP!

Some LBP patients at risk for prolonged episode including sickness absence

- Recent studies show that LBP management based on a **stratification strategy** to identify patients at risk show better clinical and economic outcomes.

- For example:
  - study by Hill et al. JAMA 2011 Stratification based on STarT Back Screening
## STarT Back Screening Tool

### The Keele STarT Back Screening Tool

<table>
<thead>
<tr>
<th>Question</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My back pain has spread down my leg(s) at some time in the last 2 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I have had pain in the shoulder or neck at some time in the last 2 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I have only walked short distances because of my back pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. In the last 2 weeks, I have dressed more slowly than usual because of back pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. It’s not really safe for a person with a condition like mine to be physically active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Worrying thoughts have been going through my mind a lot of the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I feel that my back pain is terrible and it’s never going to get any better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. In general I have not enjoyed all the things I used to enjoy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Overall, how bothersome has your back pain been in the last 2 weeks?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Not at all: 0
- Slightly: 0
- Moderately: 0
- Very much: 1
- Extremely: 1

Patient name: ___________________________  Date: ____________
STarT Back Screening Tool

Low risk: Advice, reassurance, medication

Medium risk: standard individual physiotherapy

High risk: intense care such as a multifactorial psychosocial approach

→ RCT using a stratified management approach

→ higher health gains for patients with back pain including reducing the number of days off work!

Source: Hill et al. 2011
2.1 Risk factors for sickness absence due to LBP

Previous episode of sickness absence is strongest predictor!

- **Personal factors**: age, gender
- **Medical factors**: pain score, slide flexion
- **Workplace factors**: co-worker support, organisational support, and psychosocial job demands, shorter job tenure, but also...
- **Psychosocial factors**: bodily distress, low expectations, blaming the work for pain, no home ownership

Source: Steenstra 2005, 2015; Jensen 2013; Davey 2009
2.2 Interventions directed to the worker

- **Physical exercise** (Cochrane Review Choi et al. 2010)

- **Physical exercise focusing on work situation and using a graded activity approach e.g. physical conditioning or work hardening** (Cochrane Review Schaafsma et al. 2013)

- **Behavioural Treatment** (Cochrane review Henschke et al. 2010)

- **Multidisciplinary biopsychosocial rehabilitation program** (Cochrane review Kamper et al. 2014)

- **Workplace based interventions** (Systematic review Palmer et al. 2012)
Evidence from Cochrane reviews

Overall effect of most interventions is small, but may be clinically relevant with regard to reducing number of sick leave days.

Particularly for chronic LBP!

→ No clear additional effect of more intense interventions.
Physical conditioning as part of a return to work strategy to reduce sickness absence for workers with back pain

Cochrane Database of Systematic Reviews
30 AUG 2013 DOI: 10.1002/14651858.CD001822.pub3
Multidisciplinary biopsychosocial rehabilitation for chronic low back pain

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>MBR Mean</th>
<th>SD</th>
<th>Total</th>
<th>Usual Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbassi 2012</td>
<td>3.7</td>
<td>2.5</td>
<td>12</td>
<td>4.3</td>
<td>1.4</td>
<td>11</td>
<td>3.7%</td>
<td>-0.28 [-1.10, 0.54]</td>
</tr>
<tr>
<td>Bendix 'A' 1996/1998</td>
<td>6</td>
<td>2.2</td>
<td>50</td>
<td>6.5</td>
<td>2.2</td>
<td>49</td>
<td>13.3%</td>
<td>-0.23 [-0.62, 0.17]</td>
</tr>
<tr>
<td>Lambeck 2010</td>
<td>4.16</td>
<td>2.68</td>
<td>59</td>
<td>4.47</td>
<td>2.68</td>
<td>60</td>
<td>15.4%</td>
<td>-0.11 [-0.47, 0.24]</td>
</tr>
<tr>
<td>Linton 2005</td>
<td>2.9</td>
<td>2</td>
<td>81</td>
<td>4.1</td>
<td>2.8</td>
<td>47</td>
<td>13.8%</td>
<td>-0.52 [-0.91, -0.14]</td>
</tr>
<tr>
<td>Lukkamaa 1988</td>
<td>47.3</td>
<td>20.5</td>
<td>86</td>
<td>44.6</td>
<td>20.5</td>
<td>72</td>
<td>18.7%</td>
<td>0.13 [-0.18, 0.44]</td>
</tr>
<tr>
<td>Strand 2001</td>
<td>37.2</td>
<td>20.5</td>
<td>81</td>
<td>42.5</td>
<td>20.5</td>
<td>36</td>
<td>13.4%</td>
<td>-0.26 [-0.65, 0.14]</td>
</tr>
<tr>
<td>Von Korff 2005</td>
<td>4</td>
<td>2.3</td>
<td>99</td>
<td>4.7</td>
<td>2.1</td>
<td>98</td>
<td>21.6%</td>
<td>-0.32 [-0.60, -0.04]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>448</strong></td>
<td></td>
<td></td>
<td><strong>373</strong></td>
<td></td>
<td></td>
<td><strong>100.0%</strong></td>
<td>-0.21 [-0.37, -0.04]</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.01; Chi² = 7.96, df = 6 (P = 0.24); I² = 25%
Test for overall effect: Z = 2.49 (P = 0.01)
Workplace involvement

Workplace interventions such as occupational case management with active stakeholder involvement (worker, supervisor) are important ingredients.

- Workplace linked interventions are even cost-effective for only short sickness absence (Carroll et al. 2010)

- A RTW coordinator can play a key role in keeping a focus on the workplace and mobilising the necessary recourses to facilitate RTW (Shaw et al. 2008)
Workplace interventions to prevent work disability in workers on sick leave

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>WI</th>
<th>UC</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV, Random, 95% CI</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>1.3.1 Musculoskeletal disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anema/Steenstra 2007</td>
<td>108.4</td>
<td>76.8</td>
<td>96</td>
<td>135.1</td>
</tr>
<tr>
<td>Arnetz 2003</td>
<td>144.9</td>
<td>95.1</td>
<td>65</td>
<td>197.9</td>
</tr>
<tr>
<td>Bültmann 2009a</td>
<td>88.7</td>
<td>76.4</td>
<td>66</td>
<td>134.8</td>
</tr>
<tr>
<td>Lambeek 2010a</td>
<td>129.4</td>
<td>117.8</td>
<td>66</td>
<td>197.63</td>
</tr>
<tr>
<td>Verbeek 2002a</td>
<td>114</td>
<td>113</td>
<td>50</td>
<td>134</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>343</td>
<td>336</td>
<td>74.9%</td>
<td>-40.47 [-55.98, -24.96]</td>
</tr>
<tr>
<td>Heterogeneity: Tau² = 19.33; Chi² = 4.25, df = 4 (P = 0.37); I² = 6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 5.11 (P &lt; 0.00001)</td>
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<td></td>
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</tr>
</tbody>
</table>

1.3.2 Mental health problems

van Oostrom 2010a | 140.9 | 110 | 73 | 141 | 112 | 72 | 14.1% | -0.10 [-36.24, 36.04] |
| Vlaesfeld 2012a | 190 | 120 | 65 | 210 | 124 | 61 | 11.1% | -20.00 [-62.05, 22.65] |
| Subtotal (95% CI) | 138 | 133 | 25.1% | -8.42 [-35.99, 19.16] |
| Heterogeneity: Tau² = 0.00; Chi² = 0.49, df = 1 (P = 0.49); I² = 0% |
| Test for overall effect: Z = 0.50 (P = 0.55) |

Total (95% CI) | 481 | 469 | 100.0% | -33.33 [-49.54, -17.12] |
| Heterogeneity: Tau² = 145.59; Chi² = 8.68, df = 6 (P = 0.19); I² = 31% |
| Test for overall effect: Z = 4.03 (P < 0.0001) |
| Test for subgroup differences: Chi² = 3.34, df = 1 (P = 0.05), I² = 74.6% |

Cochrane Database of Systematic Reviews
5 OCT 2015 DOI: 10.1002/14651858.CD006955.pub3
Summary

LBP remains an enormous burden for workers, employers and society.

No cost-effective interventions to prevent LBP!

➢ To prevent LBP as much as possible:

- Exposure limits for lifting and WBV
- Physical exercise
- Reduce exposure to work-related risk factors using a participatory approach, ALTHOUGH not yet proven effective for prevention....
To manage LBP and sick leave:

- Physical exercise (graded activity)
- Collaboration between health care professionals
- Stepped care approach or Subgroup approach
- Include the workplace; improve communication via RTW coordinator

- Small effect sizes \(\rightarrow\) still large effect on costs
- \(\rightarrow\) relative parameter!
Effect size in reducing sickness absence relatively small but may still have an impact on reducing societal costs!

→ Significance of this reduction needs to be discussed with stakeholders; who benefits?

→ Cost-effectiveness of more intense strategies needs further research!
3. Recommendations

Stratified approach based on personal risk factors and underlying disease factors is very promising; but needs to be further implemented in daily practice.

Further refinement by also including:

- Work related risk factors
- Availability of RTW coordinator
- Collaborative network of health care providers; including stakeholders in the workplace
3. Recommendations

- More effort into finding the best way to implement potentially effective RTW interventions

- More research about barriers to and facilitators of the uptake of effective interventions for healthcare, workplace but also within the particular insurance system of a nation

- Some facilitators such as trust, respect, communication, labour relations and the role of the RTW coordinator will apply for all countries!
Thank you for your attention!
My contact details:  f.schaafsma@vumc.nl