PROMOTION OF WORKABILITY AMONG AGING WORKERS

Professor Clas-Håkan Nygård, PhD
School of Health Sciences/ IASR
University of Tampere, Finland

30.9.2014
WORKABILITY AND AGING

How does work ability change during work life and beyond?

Does work ability and strain at work predict functional abilities in old age?

How can work ability be promoted by interventions?
Why is this topic important?

- The historically recent change to low birth rates and death rates produces aging populations where there are fewer young workers to replace retiring older workers.
- Economic prosperity depends on productivity in the labor force.
- Pensions and health care systems generally also depend on labor force productivity.
- Aging adults will have to work longer in part to sustain public pension and health care systems.
Kuvio 2.7.
Huoltosuhteen toteutunut ja ennakoitu kehitys Suomessa vuosina 1900–2100.

Lähde: Human mortality database ja Tilastokeskus.
AGING WORKER

- several large changes in individual resources and capacities during working life
- often changes in health and functional capacities as well as learning and skills
- some declines and some increases – changes are individual and a lot depends on own activity
- experience may compensate declined capacity
- productivity is most often not depending on age
Productivity not depending on age
AGING AND INCREASING PSYCHOLOGICAL RESOURCES (POSITIVE CHANGES WITH AGE)

- Strategic thinking
- Wisdom
- Ability to think over and motivate
- Motivation to learn
- Work experience
- Increased loyalty
- Less absenteeism (short spells)
Long-term effects of work on old age health & functioning

- Work is a central part of adult life
- Does work effect old age health and functioning?

**Finnish Longitudinal Study of Municipal Employees (FLAME)**
**Finnish Institute of Occupational Health**
**University of Jyväskylä**
**University of Tampere**

44-58y. 48-62y. 55-67y. 60-72y. 72-84y.

- Work exposures
  - Work ability
  - Work-related stress
  - Mental job strain
  - Physical job strain
  - Work & leisure time physical activity
  - Work environment & conditions

- Health & functioning
  - Disability
  - Physical performance
  - Chronic diseases
  - Hospital in-patient care
  - Medication use register
  - Mortality

Living habits, socioeconomic status, health, family etc.
FINNISH LONGITUDINAL STUDY ON MUNICIPAL EMPLOYEES (FLAME)

Baseline in 1981
n = 6,257 / 7,344

1985
n = 5,556

1992
n = 4,534

1997
n = 3,917

2009
n = 3,093

^ Municipal employees born between 1923-1937
^ 2,863 (45.8%) participated in all waves
Work ability and age

Gould et al, 2008
Variation in individual work ability
Variation of individual work ability inside one occupation

**OFFICE WORK**

Women (n=86)

WAI

**INSTALLATION WORK**

Men (n=62)

Work ability index, scores

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>44</td>
<td>45</td>
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<tr>
<td>45</td>
<td>40</td>
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<td>46</td>
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<td>48</td>
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<td>49</td>
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<td>62</td>
<td>30</td>
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<tr>
<td>63</td>
<td>25</td>
</tr>
<tr>
<td>64</td>
<td>27</td>
</tr>
</tbody>
</table>
### Improvement in work ability

**Table 63. Model of work and lifestyle factors associated with an improvement in work ability** (n = 555) - odds ratios (OR) and 95% confidence intervals (95% CI) of the logistic regression model (Tuomi et al. 1997)

<table>
<thead>
<tr>
<th>variable</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive movements b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not decreased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>decreased</td>
<td>2.1</td>
<td>1.0–3.4</td>
</tr>
<tr>
<td>Satisfaction with supervisor’s attitudes b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not increased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>increased</td>
<td>3.6</td>
<td>1.8–7.2</td>
</tr>
<tr>
<td>Vigorous physical exercise in leisure time b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not increased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>increased</td>
<td>1.8</td>
<td>1.0–3.5</td>
</tr>
</tbody>
</table>

*a* the score in the work ability index had improved at least three points from 1981 to 1992

*b* change from 1981 to 1992

### Decrease in work ability

**Table 64. Model of work and lifestyle factors associated with a decline in work ability** (n = 805) - odds ratios (OR) and 95% confidence intervals (95% CI) of the logistic regression model (Tuomi et al. 1997)

<table>
<thead>
<tr>
<th>variable</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing in one place b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not increased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>increased</td>
<td>1.7</td>
<td>1.0–2.9</td>
</tr>
<tr>
<td>Satisfaction with workrooms b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not decreased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>decreased</td>
<td>1.6</td>
<td>1.0–2.6</td>
</tr>
<tr>
<td>Possibility for recognition and esteem at work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not decreased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>decreased</td>
<td>2.4</td>
<td>1.4–4.3</td>
</tr>
<tr>
<td>Vigorous physical exercise in leisure time b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not decreased</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>decreased</td>
<td>1.8</td>
<td>1.2–2.8</td>
</tr>
</tbody>
</table>

*a* the score in the work ability index had fallen by at least 10 points from 1981 to 1992

*b* change from 1981 to 1992
Work ability in midlife as a predictor of mortality and disability in later life: a 28-year prospective follow-up study

Mikaela B. von Bonsdorff PhD, Jorma Seitsamo PhD, Juhani Ilmarinen PhD, Clas-Håkan Nygård PhD, Monika E. von Bonsdorff PhD, Taina Rantanen PhD

ABSTRACT

Background: Poor work ability correlates with increased morbidity and early retirement from the workforce, but the association in old age is not known. We investigated work ability in midlife among white-collar and blue-collar employees as a predictor of mortality and disability 28 years later.

Methods: A total of 5971 occupationally active people aged 44–58 years participated in the Finnish Longitudinal Study of Municipal Employees (FLAME) in 1981. Perceived work ability relative to lifetime best was categorized as excellent, moderate or poor. In 2009, the ability to perform activities of daily living was assessed among 2879 respondents (71.0% of the survivors). Mortality data were available up to July 2009.

Results: At the 28-year follow-up, 1918 of the 5971 participants had died and 1403 had some form of disability. Rates of death per 1000 person-years among white-collar men were 7.7 for those with excellent work ability, 14.7 for those with moderate work ability and 23.5 for those with poor work ability. Among blue-collar men, the corresponding rates were 15.5, 20.2 and 25.3. In women, rates ranged between 6.3 and 10.6 per 1000 person-years. The age-adjusted hazard ratios (HRs) for mortality were two to three times higher among blue-collar male employees with lower work ability than among white-collar male employees with excellent work ability in midlife (i.e., the reference group). The odds of death or disability at follow-up compared with white-collar workers with excellent work ability were highest among blue-collar employees with poor work ability in midlife (odds ratio [OR] 4.56, 95% confidence interval [CI] 2.82–7.37 for men; OR 3.37, 95% CI 2.28–4.98 for women). Among the survivors, similar but slightly lower risks of disability 28 years later were found.

Interpretation: Perceived poor work ability in midlife was associated with accelerated deterioration in health and functioning and remains evident after 28 years of follow-up.
ADL DISABILITY AT FOLLOW-UP IN 2009
ACCORDING TO PROFESSIONAL CLASS AND WORK ABILITY IN MIDLIFE IN THE YEAR 1981

Women

<table>
<thead>
<tr>
<th>Work Ability Level</th>
<th>Blue-collar</th>
<th>White-collar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent work ability</td>
<td>90%</td>
<td>80%</td>
</tr>
<tr>
<td>Moderate work ability</td>
<td>75%</td>
<td>70%</td>
</tr>
<tr>
<td>Poor work ability</td>
<td>50%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Men

<table>
<thead>
<tr>
<th>Work Ability Level</th>
<th>Blue-collar</th>
<th>White-collar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent work ability</td>
<td>100%</td>
<td>95%</td>
</tr>
<tr>
<td>Moderate work ability</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>Poor work ability</td>
<td>75%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Bonsdorff et al, 2011
Risk for ADL disability according to midlife professional group and work ability*

*adjusted for age+marital status+alcohol intake+smoking+exercise+main chronic diseases

Bonsdorff et al, 2011
Original article

Scand J Work Environ Health – online first. doi:10.5271/sjweh.3177

Work strain in midlife and 28-year work ability trajectories

by Monika E von Bonsdorff, PhD,1,2 Katja Kokko, PhD,3 Jorma Seitsamo, PhD,4 Mikaela B von Bonsdorff, PhD,2 Clas-Håkan Nygård, PhD,4 Juhani Ilmarinen, PhD,1 Taina Rantanen, PhD 2

WORKABILITY TRAJECTORIES FOR WOMEN DURING A 28-YEAR FOLLOW-UP

n=1700

- G1, work ability declining from excellent to moderate (60.1%)
- G2, work ability collapsing from moderate to poor (4.3%)
- G3, U-shaped decline in work ability from moderate to poor (28.1%)
- G4, U-shaped decline in poor work ability (7.5%)

(von Bonsdorff ME et al, 2011)
RATES PER 1000 PERSON-YEARS FOR HOSPITAL IN-PATIENT CARE

MEN

Mental job strain
- Low: 7.85
- Medium: 10.05
- High: 10.89

Physical job strain
- Low: 7.78
- Medium: 9.68
- High: 12.56

WOMEN

Mental job strain
- Low: 8.42
- Medium: 8.2
- High: 8.14

Physical job strain
- Low: 6.63
- Medium: 7.91
- High: 10.35
**Interpretation:** Perceived poor work ability in midlife was associated with accelerated deterioration in health and functioning and remains evident after 28 years of follow-up.
Inverse effects of midlife occupational and leisure time physical activity on mobility limitation in old age – a 28-year prospective follow-up study

Timo Hinrichs, MD, a,b Mikaela B. von Bonsdorff, PhD, c Timo Törmäkangas, PhD, c Monika E. von Bonsdorff, PhD, c,d Jenni Kulmala, PhD, c Jorma Seitsamo, PhD, e Clas-Håkan Nygård, PhD, f Juhani Ilmarinen, PhD, g and Taina Rantanen, PhD c

CONCLUSION: Findings suggest that LPA and OPA in midlife have independent, inverse effects on mobility in old age, in terms of a harmful effect of vigorous OPA and a protective effect of vigorous LPA.
## Job profiles in mid-life and functional disabilities in old age

<table>
<thead>
<tr>
<th>Job profile</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auxiliary work</strong></td>
<td>1.89(1.08–3.30)</td>
</tr>
<tr>
<td><strong>Home care work</strong></td>
<td>2.38(1.36–4.18)</td>
</tr>
<tr>
<td><strong>Office</strong></td>
<td>1.74(1.00–3.02)</td>
</tr>
<tr>
<td><strong>Nursing</strong></td>
<td>1.35(0.84–2.17)</td>
</tr>
<tr>
<td><strong>Kitchen supervision</strong></td>
<td>3.74(1.81–7.72)</td>
</tr>
<tr>
<td><strong>Dentist</strong></td>
<td>0.93(0.35–2.40)</td>
</tr>
<tr>
<td><strong>Physician’s work</strong></td>
<td>1.07(0.19–5.84)</td>
</tr>
<tr>
<td><strong>Teaching work</strong></td>
<td>1.21(0.66–2.20)</td>
</tr>
<tr>
<td><strong>Administrative</strong></td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Male**

<table>
<thead>
<tr>
<th>Job profile</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auxiliary work</strong></td>
<td>1.86(0.82–4.21)</td>
</tr>
<tr>
<td><strong>Installation work</strong></td>
<td>0.99(0.48–2.06)</td>
</tr>
<tr>
<td><strong>Transport work</strong></td>
<td>0.65(0.29–1.42)</td>
</tr>
<tr>
<td><strong>Dump work</strong></td>
<td>0.63(0.09–4.02)</td>
</tr>
<tr>
<td><strong>Office</strong></td>
<td>0.92(0.09–9.10)</td>
</tr>
<tr>
<td><strong>Nursing</strong></td>
<td>0.50(0.17–1.46)</td>
</tr>
<tr>
<td><strong>Technical supervision</strong></td>
<td>2.15(1.01–4.55)</td>
</tr>
<tr>
<td><strong>Dentist</strong></td>
<td>1.25(0.12–12.41)</td>
</tr>
<tr>
<td><strong>Physician’s work</strong></td>
<td>0.80(0.24–2.66)</td>
</tr>
<tr>
<td><strong>Teaching work</strong></td>
<td>1.35(0.66–2.77)</td>
</tr>
<tr>
<td><strong>Administrative</strong></td>
<td>1.00</td>
</tr>
</tbody>
</table>
Promotion of work ability

**Figure 2.2.** Tetraedric model for promoting work ability.

Source: Timmarinen 2006.
Age management

- **Age attitude**
  - negative/positive
  - own
  - employees

- **Work design**
  - static/ dynamic
  - changing individual resources
  - individuality

- **Team work**
  - hierarchy/teams
  - participatory
  - respect

- **Communication**
  - information about changes
  - discussions
  - open mind
Human resources and work demands

Figure 57. Basic problem and basic solution: relationship between human resources and work demands

(Ilmarinen, 2006)
Recovery and aging
The effectiveness of interventions for ageing workers: retirement, work ability and productivity: a systematic review

Laura Cloostermans · Marga B. Bekkers · Ellen Uiters · Karin I. Proper

Received: 18 October 2013 / Accepted: 17 July 2014 © Springer-Verlag Berlin Heidelberg 2014
SHORT REPORT

Absenteeism following a workplace intervention for older food industry workers

A. Siukola, P. Virtanen, H. Huhtala and C.-H. Nygard
School of Health Sciences, FI-33014 University of Tampere, Tampere, Finland.
PROMOTION OF WORKABILITY
55+ SENIOR PROGRAM

The senior program aimed to pay attention to the special needs of the worker i.e.:
- conversation with the supervisor about work demands and work ability
- possibilities and motivation to change the work contents
- flexible working hours and no night work
- educational training
- rehabilitation
Blue-collar workers ≥ 55 years

Senior program / intervention group
N = 129

Workers not in the program / control group
N = 229

• The mean age in both groups was 57 years
• 80% of the intervention group was women and respectively 68% of the control group
### Sickness Absence per Person-Year During Follow-Up

<table>
<thead>
<tr>
<th>Measure of sickness absence</th>
<th>Intervention versus control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR</td>
</tr>
<tr>
<td>Days¹</td>
<td>0.822</td>
</tr>
<tr>
<td>Spells²</td>
<td></td>
</tr>
<tr>
<td>1-3 days</td>
<td>1.340</td>
</tr>
<tr>
<td>4-7 days</td>
<td>1.227</td>
</tr>
<tr>
<td>8-21 days</td>
<td>0.921</td>
</tr>
<tr>
<td>&gt;21 days</td>
<td>0.683</td>
</tr>
</tbody>
</table>

1. Negative binomial distribution used in statistical analyses
2. Poisson regression used in statistical analyses
Key points

- Blue-collar workers aged 55 and over years had an increased risk of total sickness absence and spells of 1–7 days absence but a reduced risk of spells >21 days absence for up to 5 years after participating in a workplace senior programme in a Finnish food company.
- A workplace intervention might affect the sickness absence profile of older employees, potentially reducing the risks and costs of early retirement.
ORIGINAL ARTICLE

Effect of aerobic training on hot flushes and quality of life—a randomized controlled trial

RIITTA LUOTO1,2, JAANA MOILANEN3, REETTA HEINONEN3, TOMI MIKKOLA4, JANI RAITANEN1,3, EJJA TOMAS3, KATRIINA OJALA1, KIRSI MANSIKKAMÄKI1 & CLAS-HÅKAN NYGÅRD3

1UKK Institute for Health Promotion Research, Tampere, Finland, 2National Institute for Health and Welfare, Helsinki, Finland, 3School of Health Sciences, University of Tampere, Finland, 4Helsinki University Central Hospital, Helsinki, Finland, and 5Tampere University Central Hospital, Tampere, Finland
Eligible women (phone calls)  
N = 350  
Not fulfilling inclusion criteria  
N = 174  
Randomization N = 176  
Intervention  
N = 88  
Drop-out  
N = 14  
Not working  
N = 64  
Included in analyses  
N = 54  
Control  
N = 88  
Drop-out  
N = 8  
Included in analyses  
N = 58
Physical exercise intervention and work ability

Work ability index vs. Time in months

- Control group
- Intervention group

Statistical significance:
- p=0.004
- p=0.34
- p=0.67
Physical Exercise Intervention Effects

- Overall well-being improved
- Hot flushes decreased during nights
- Sleep improved
- Perceived physical strain decreased
- Work ability increased
AGING AND WORK

GENERAL CONCLUSIONS

- Individual differences increase with age
- Physical capacity decreases with age but psychological and social functions remain almost same during working life
- Older learn as good as younger
- Negative aspects are stressed and positive aspects underestimated among older workers
- The need for recovery increases with age
- Mid-life work demands predict functional disabilities in old age
- Work ability can be promoted by matching work demands with functional capacities and/or improving functional capacity
- Promotion of work ability is also a public health issue