ELSEVIER

www.ics-elsevier.com

Assessment of work ability and vitality—a study of teachers of different age groups

Gabriele Freude[a,*], Reingard Seibt[b],
Eberhard Pech[a], Peter Ullsperger[a]

[a]*Federal Institute for Occupational Safety and Health, Berlin, Germany*
[b]*Technical University of Dresden, Institute and Polyclinic for Occupational and Social Medicine, Dresden, Germany*

Abstract. This study was performed to analyse work ability and vitality of teachers of different age groups (group 1: <45 years, group 2: ≥45 years) working at comprehensive secondary schools. Particularly, we were interested in detecting factors influencing work ability. 100 female teachers were included in this analysis. A multidisciplinary approach was applied, including life style analysis, work anamnesis, work ability index, scores of the effort–reward-imbalance (ERI) and of the relaxation inability (RI), burnout risks analysis (Maslach Burnout Inventory) as well as different physical, mental and social parameters of the participants, which were analysed by a so called measuring station of vitality. It was shown that already 24% of teachers of the younger age group and 49% of the elderly teachers show a poor/moderate work ability, which indicates an urgent need for measures for improving work ability. More than 50% of teachers suffer from psychic (exhaustion, fatigue, memory and concentration problems) and muscular–skeletal disorders. Factors positively influencing work ability are a low number of physical and psychological complaints, an appropriate relation between effort and reward at work and a low burnout risk. Factors which could be identified to be related to a low work ability are a high number of health complaints, a low level of physical fitness and an inappropriate waist–hip ratio. Measures for preventing a decline of work ability of teachers with increasing age should focus on identifying the reasons for health complaints, on measures which focus on effort and reward at work and on a healthy life style (avoiding individual health risk factors). Actions for promotion work ability of teachers are an important objective for preventing teachers from early retirement. © 2005 Published by Elsevier B.V.

Keywords: Work ability; Vitality; Age; Teacher

 * Corresponding author. D-12437 Berlin Federal Institute for Occupational Safety and Health Noeldnerstraße 40-42, Germany. Tel.: +49 30 515484411; fax: +49 30 515484171.
  E-mail address: freude.Gabriele@baua.bund.de (G. Freude).

1. Introduction

The teacher profession is characterised by a relatively high level of sick leave and early retirement often related to impaired work ability due to stress and excessive psychosocial problems. Interventions aiming at improving and maintaining work ability require the identification of risk factors leading to impaired work ability. In this study, a multidisciplinary approach was applied, including life style analysis, work anamnesis, work ability index, scores of the effort–reward-imbalance (ERI), of relaxation inability (RI), of burnout risks (Maslach Burnout Inventory) as well as different physical, mental and social parameters of the participants, which were analysed by a so called Measuring station of vitality.

2. Methods

130 teachers participated in this study, 30 male and 100 female. This represents the real numerical proportion between male and female teachers at schools. On the average, about one third of teachers are male and about two third are female. Because of the unequal distribution between male and female participants and the low number of elderly male teachers, only the 100 female teachers were included in this analysis.

The overall participation rate was 58%. Two age groups were separated for further analysis: teachers younger than 45 years (<45 years, $n=49$, mean age$=38 \pm 4$ years) and teachers older than 45 years (≥ 45 years, $n=51$, mean age$=51 \pm 5$ years).

A multidisciplinary approach was applied including the following methodological approaches and instruments:

1. life style analysis and work anamnesis
2. work ability index (WAI, [1])
3. Effort–reward-imbalance (ERI, [2])
4. relaxation inability (RI, [3])
5. Maslach Burnout Inventory [4]
6. measuring station of vitality [5]

The measuring station of vitality was applied to estimate the so called biological age representing the functional state of individuals in relation to their physical, mental and social capabilities. The measuring station of vitality comprises 56 parameters for measuring the physical functional capacity, the mental functional capacity and the social competencies

cardiovascular system: blood pressure, cardiovascular reaction after exercise test (knee bending test) for evaluating physical fitness, vital capacity of lungs
muscular–skeletal system: psychomotor endurance, psychomotor speed, visomotor coordination, muscular strength
sense organs: vision, hearing acuity
body composition: body fat, muscular mass
cognitive functions: reaction capabilities, concentration, problem solving ability, cognitive flexibility

personality characteristics: extra/introversion, rigidity, stress disposition; social competence: social abilities, social dominance, social ability, social activity

The data of the 100 participants were analysed using advanced statistical methods including CHI Squared Automatic Interaction Detector (CHAID, [6]) for detecting best predictors for a good/excellent or moderate/poor work ability.

3. Results

On the average, 13% of the teachers had an excellent, 50% a good, 28% a moderate and 9% a poor work ability. That means that 37% of all teachers were identified to have a poor and moderate work ability, which makes measures for restoring and improving work ability urgently necessary.

Mean WAI of teachers of the older age group was 39 ± 4 and of the younger age group 36 ± 9. In the younger age group, 24% had a poor and moderate work ability; in the older age group, 49% had a poor and moderate work ability. This high proportion of poor and moderate work ability indicates a great risk for early retirement.

Analysing the WAI subscales, it is obvious that there were no differences in the number of diagnosed illnesses (WAI 3), but elderly teachers feel more affected by the illnesses (WAI 4). Furthermore, no differences in the number of sick leave between younger and older teachers could be found.

Although younger teachers reported less physical and psycho-mental complaints, the differences were not significant. 65% of the younger and 71% of the older teachers suffer from exhaustion and tiredness and 60% to 70% from musculo-skeletal disorders. Beside of exhaustion, tiredness and musculo-skeletal disorders, memory and concentration problems, excitability and headache belong to the most frequently reported complaints.

Analysis of mental functions by means of the measuring station of vitality revealed that psycho-mental capacities of teachers are rather high in comparison to the reference population which underlie the multidisciplinary test battery [5]. That's not surprising because teachers allocate their psycho-mental capacities every day and functions which were trained regularly do not deteriorate.

It could be furthermore shown (Fig. 1) that teachers belonging to the excellent and good WAI group have a better health status than teachers belonging to the moderate and poor WAI group (lower BMI, less health complaints, a better physical fitness).

CHAID was applied to detect best predictors for a good/excellent or a moderate/poor work ability. The following parameters reached the highest level of significance: number of physical and psychological complaints, fitness index (pulse performance index, [5]), effort–reward-imbalance, waist–hip ratio and burnout risks.

As shown in Fig. 2, the mean WAI for all teachers was 38 ± 6. Teachers showing a lower number of complaints (BFB$\leq$7) revealed a higher WAI (mean: $40 \pm$, $n = 50$) than teachers reporting more complaints (BFB>7, mean WAI: 35 ± 6, $n = 50$). Additionally, it was found that WAI is higher in teachers showing a more appropriate balance between effort and reward (ERI$\leq$0.57, mean WAI: 42 ± 3, $n = 23$) than teachers with a higher ERI ratio (ERI>0.57, mean WAI: 38 ± 4, $n = 27$). Highest WAI mean
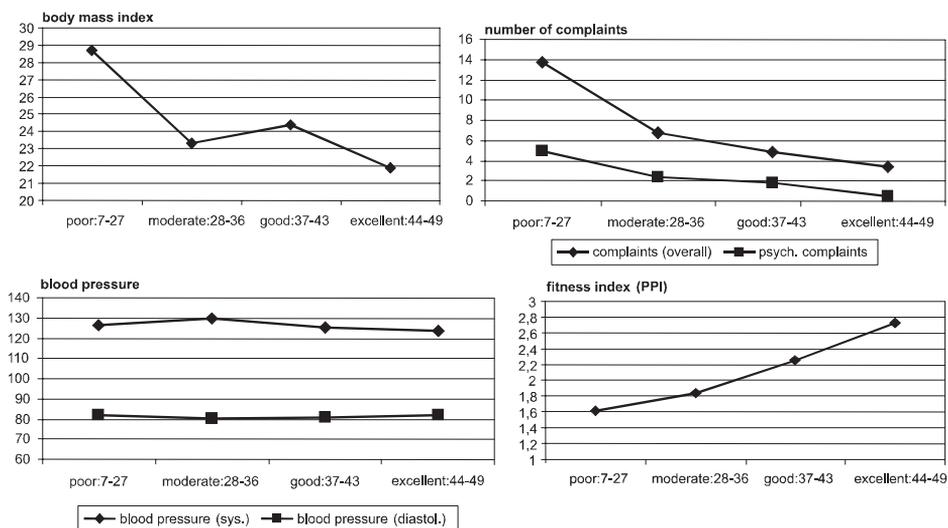
Fig. 1. Parameters characterising teachers health status (body mass index, number of complaints, blood pressure, physical fitness) for the 4 different WAI groups.

values (WAI=43 ± 3, n=16) were found in teachers showing additionally no burnout symptoms.

Lowest mean WAI values (WAI=24 ± 3) were found in teachers with a poor physical fitness (low fitness index) and an inappropriate waist–hip ratio, e.g. in teachers showing more individual health risk factors.
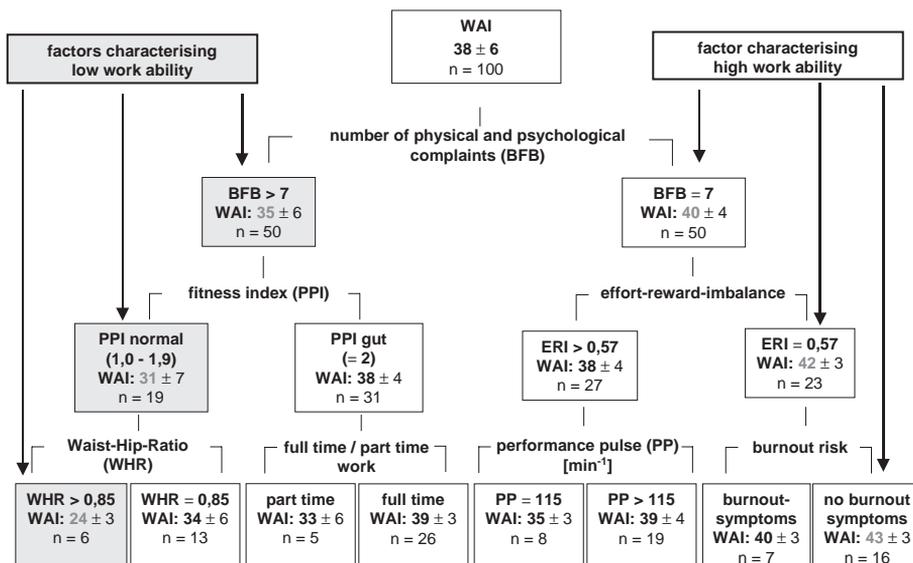

Fig. 2. Significant predictors for work ability scores (computed by CHAID): number of physical and psychological complaints, ERI (effort–reward-imbalance), fitness index, waist–hip ratio, burnout risk.

4. Discussion and conclusions

The present pilot study shows that work ability of teachers is significantly influenced by the number of their complaints, by individual health risk factors (physical fitness, body compositions) and by work-related factors, i.e. by the balance between effort and reward (ERI).

Measures for preventing a decline of work ability of teachers with increasing age should focus on detecting the reasons of their health complaints, on achieving appropriate work demands (appropriate working hours and responsibilities, low time pressure and appropriate gratification) in the everyday working life. Furthermore, individual measures aiming at improving health status (activities for improving individual fitness, measures for avoiding overweight) are of particular importance.

The results shown let us conclude that specific actions for promotion work ability in teachers may represent an important objective for preventing teachers from early retirement.

References

[1] K. Tuomi, et al., Work Ability Index, Finnish Institute for Occupational Health, 1998.
[2] J. Siegrist, Adverse health effects of high effort-reward conditions at work, J. Occup. Health Psychol. 1 (1996) 27–43.
[3] P. Richter, M. Rudolf, C.F. Schmidt, Fragebogen zur Analyse beansprungungsrelevanter Anforderungsbewältigung. Frankfurt a. M.: Swets and Zeitlinger, 1998.
[4] C. Maslach, S.E. Jackson, Maslach Burnout Inventory, Consulting Psychologists Press, Palo Alto, CA, 1986.
[5] D. Meißner-Pöthig, U. Michalak, Vitalität und ärztliche Intervention, Hippokrates, Stuttgart, 1997.
[6] C. Magidson, The CHAID approach to segmentation modeling: CHI-squared automatic interaction protection, in: R. Bagozzi (Ed.), Advanced Methods of Marketing Research, Blackwell, 1994.