

# Effects of early support intervention on workplace ergonomics – a two-year follow-up study

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**Abstract.** The purpose of the controlled longitudinal study was to determine the effect of a tailored early support intervention method on workers' workplace ergonomics. The main areas of the early support intervention were training, guidance and support for supervisors in finding weak signals of impaired ergonomics. Supervisors were also trained to bring up these weak signals in discussion with employees and to make necessary changes at the workplace.

The data consisted of 301 intervention subjects and 235 control subjects working in the field of commerce. The questionnaires were carried out in 2008 and in 2010, and the response rates among both groups were 45%. We used multivariate repeated measures analysis of variance (*MANOVA*) to test the difference in the groups at two points of time. The main result was that in the areas of work environment, the interaction between group and time was statistically significant ( $p=0.0004$ ). The work environment improved in the intervention group, but deteriorated in the control. Working methods improved due to the interventions, but physical load factors increased over time in both groups. According to the study, tailored early support intervention has a generally beneficial impact on workers' workplace ergonomics in the areas of work methods, work environment and accident factors.

Keywords: Ergonomics, work ability, weak signals, work environment, health promotion

## Introduction

The workforce in Finland is getting older. Present actions for keeping workers' work ability at a satisfying level are not necessarily sufficient. Thus working life needs tailored actions in order to maintain workers' work ability at a needs-based level. Early support intervention focusing on employees' work ability is a new concept at workplaces. The objectives of this method are to promote workers' work ability and to achieve the necessary changes in working conditions such as the work environment and work methods. Poor working conditions may be related to work ability, and weak signals concerning these are apparent at an early stage of impaired work ability.

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## Material and methods

Our controlled longitudinal study consisted of 301 intervention subjects and 235 control subjects. Information was collected by means of questionnaires given to groups in the field of commerce: the preliminary questionnaire was carried out in 2008, and the final questionnaire in 2010. The response rate among the intervention group was 45.1% and in the control group 45.4%.

In the intervention, supervisors were taught to find and use weak signals to support workers' work ability and to look at work ability from a new perspective. Weak signals vary from one workplace to another and thus the understanding of these signals and their utilization can be challenging at different workplaces. Supervisors were trained to bring up weak signals for discussion by using e.g. role playing. The intervention also consisted of homework, group work and discussions between supervisors and trainers.

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We applied factor analysis to reduce the number of items, and used multivariate repeated measures analysis of variance (*MANOVA*) to test the difference in the groups at two points of time. We examined physical working conditions from the perspectives of

the work environment, accident factors, work methods and the physical load factors of work. The Cronbach alpha of the scales varied from 0.79 to 0.88 (Table 1).

Table 1

Cronbach alpha of study group's physical working condition scales before and after intervention.

	Before intervention	After intervention
Physical load factors (6 items)	0.87	0.88
Work methods (5 items)	0.80	0.79
Work environment (5 items)	0.81	0.81
Accident factors (9 items)	0.82	0.82

### Results and conclusions

The proportion of respondents who considered physical working conditions poor or problematic decreased in both groups; in the areas of physical load factors, work methods, and work environment (Table 2).

Physical load factors statistically increased over time ( $p=0.02$ ) in both groups but there were no statistically significant differences between the

groups themselves. Working methods showed a greater statistical increase among the intervention subjects during the intervention than among controls ( $p=0.03$ ). The interaction between group and time was statistically significant ( $p=0.0004$ ) in the area of work environment. The assessments of accident factors remained at almost the same level between the two questionnaire times (Table 3).

Table 2

Physical working conditions were poor/problematic before and after the intervention, % of respondents.  $n=301$  intervention group (IG),  $n=235$  control individuals (CG).

	Before intervention IG %	After intervention IG %	Before intervention CG %	After intervention CG %
Physical load factors	49.4	22.3	48.1	22.4
Work methods	9.4	3.1	11.0	4.6
Work environment	9.7	2.7	8.7	5.0
Accident factors	0.9	1.7	1.7	2.1

Table 3

Physical working conditions before and after the intervention, means (1=good, 3=poor/ problematic) and variance analysis (*MANOVA*)  $p$ -values.  $n=301$  intervention group (IG),  $n=235$  control individuals (CG).

	Before intervention IG mean CG mean	After intervention IG mean CG mean	Group $p$	Time $p$	Group x Time $p$
Physical load factors	2.21 2.20	2.26 2.23	0.68	0.02*	0.72
Work methods	1.79 1.77	1.70 1.77	0.03*	0.37	0.90
Work environment	1.66 1.66	1.57 1.69	0.22	0.41	0.0004***
Accident factors	1.32 1.36	1.28 1.34	0.21	0.47	0.27

\* $p \leq 0.05$ , \*\* $p \leq 0.01$ , \*\*\* $p \leq 0.001$

According to the study, tailored early support intervention has a generally beneficial impact on workers' workplace ergonomics in the areas of work methods, work environment and accident factors.

However, although workplace ergonomics improved, physical load factors increased over time. The employees who participated in the early support intervention may still need further support from staff and occupational health services in order to promote the ergonomics of their own workplace. Moreover, the two-year follow-up time may be too short to elicit notable changes in physical load factors.