

## Evaluating the effect of stress management programmes at the work-site on absenteeism reduction: a systematic review

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### Abstract

**Background:** In the European Union, work-related stress affects about one in four workers, and it may be responsible for the loss of productivity, healthcare consumption and absenteeism. The objective of our study was to estimate whether stress programmes aimed at managing and preventing work-related stress reduced the rate of absenteeism.

**Methods:** We searched electronic databases for relevant articles assisted by hand searching for references. We included studies that had an experimental or quasi-experimental design, describing an intervention focused either on the work organisation or on workers' characteristics as well as reporting a measure of absenteeism.

**Results:** The search identified 2520 articles: among these, nine met our inclusion criteria. Stress management programmes reduced absenteeism shortly after the intervention however in the long term there was no evidence to support this.

**Conclusion:** Future studies should evaluate stress management programmes that consist of repeated interventions over longer periods of time, focusing on effectiveness and relative costs.

*Key words:* work-related stress, stress management programmes, absenteeism, systematic review

### Introduction

In the European Union, work-related stress is a major occupational health problem, second only to lower back pain. The 2000 Third European survey on working conditions identified work-related stress in about one in four European workers, i.e. in about 40 million people.

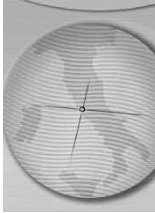
It has been shown that job stress has a remarkable impact on the health of workers, being related to depression, anxiety, nervousness, fatigue and cardiac diseases [1]. In the United Kingdom 10% of working people affected by job-related diseases suffer from stress and depression [2].

Stress can negatively influence work organization, creativity and competitiveness and it may be responsible for the loss of productivity, healthcare consumption and absenteeism. The loss of working days caused by absence due to stress for EU workers is pertinent with more than a quarter of absenteeism from work, for periods of two or more weeks, being related to job stress [3] and between 50% and 60% of total working days lost being linked to work related stress. The economic impact for the member states in 1999 was estimated to be about €20 billion. In the same

year, the costs for absenteeism in Sweden were about €450 million, about 10% of the total cost for work related disease. The United Nations International Labor Organization estimated the cost of lost productivity resulting from work absenteeism at US \$200 billion a year for the United States alone [4]. Any worker can be affected by work related stress, with no regards to job type or position and organization size.

According to the definition of the European Agency for Safety and Health at Work, stress originates from an excess of demands from the working environment or from a lack of the worker's ability to face and control it [5-6]. This definition focuses on the working origin of stress, consisting in a "pattern of emotional, cognitive, behavioural and physiological reactions to adverse and noxious aspects of work organisation, work content and work environment" [4,7].

Stressful working environments are recognised as a workplace hazard and policies are being introduced to improve psychosocial working conditions in many countries [8]. In order to manage and prevent work-related stress it is



possible to act either on the work organization, by reducing the causes of stress, or on workers' characteristics, by improving their ability to face stressful situations [9-10]. It has been suggested that a potential benefit for employers who manage to improve psychosocial working conditions is reduced levels of absenteeism due to sickness [7,10]. Previous reviews have evaluated the effectiveness of different programmes aimed at managing job stress on the basis of qualitative analyses [11]. In 2001, Van der Klink et al. carried out a quantitative meta-analysis to determine the effectiveness of stress-reducing interventions [12], showing that cognitive-behavioural and relaxation interventions were more effective than organizational ones; in addition, some outcome measures (psychological responses and resource, quality of work, anxiety and depressive symptoms) showed a larger improvement than others. With regards to loss of work days, this systematic review found that the interventions were not effective in reducing absenteeism.

However, this review considered very few studies that measured variation in absenteeism rates, so it is not clear whether stress management programmes have an effect on sickness absence. Therefore, we aimed to estimate through a systematic review whether health programmes aimed at managing and preventing work-related stress reduced the rate of absenteeism.

## Methods

### Search strategy

Electronic databases were searched for relevant articles (MEDLINE, NIOSHTIC, COCHRANE LIBRARY, EMBASE), using different search strategies and using a combination of the following terms: *job stress, work stress, worksite stress, stress management, worksite stressor, work related stress, distress at work, stress therapy, stress reduction, occupational stress, absenteeism, sickness leave and stress absence*. In addition, in order to integrate the results, we carried out a hand search of references. A further analysis of grey literature was conducted looking for unpublished studies about work-related stress in generic search engines (google, vivisimo) but the search did not produce any experimental studies of good quality.

The search covered studies published between January 1982 and December 2005.

### Study selection

We decided to include studies with an experimental or a quasi-experimental design, describing interventions focused either on the

work organization or on workers' characteristics, which reported a comparison with a reference or control group and used absenteeism as one of the outcome measures.

### Quality assessment

The methodology of each study was assessed independently by two authors (L.P., A.S.) according to a score based on a 10-points scale, consisting of 5 potential sources of bias, adapting the items according to our topic [13,14]. Disagreements were resolved with a third epidemiologist (G.D.) or by consensus. The cut-off value for including an article in our systematic review was 6/10.

### Data extraction and analysis

We reported relevant data from each article in an ad hoc data sheet, containing data about author, year of publication, country, type of intervention, type of working population, size of control and intervention group, duration of intervention, duration of follow-up, measure of absenteeism used and the comparison of absenteeism between the two groups (Table 1).

Figure 1 represents the flow chart for the inclusion of studies in the systematic review. The combined searches resulted in a total of 2520 potentially relevant studies identified by abstract and title. Out of these studies, 2511 were excluded because either they considered different

Figure 1. Flow chart for the inclusion of studies

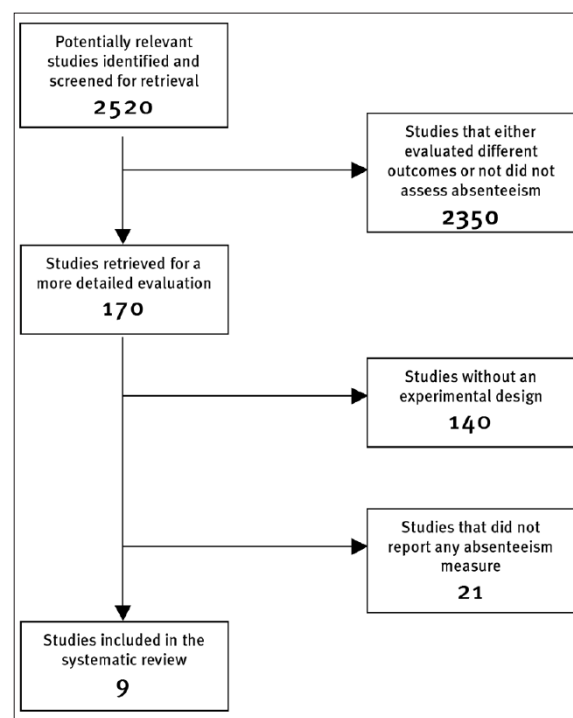
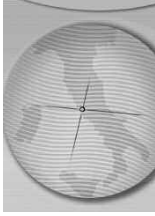


Table 1. Characteristics of studies included in the systematic review

Authors	Country	Year	Working Population	Type of intervention	Control group	Duration of Intervention (Weeks)	Duration of Follow-up (Months)	Duration of Absenteeism measure	Results	Possible bias
<b>Rahe</b>	Norway	2002	Computer industry employees (n=167) City government employees (n=176)	<b>Individual</b> (Personalized feedback, wellness seminar, small-group educational sessions)	164	48	12	Median (range) of days reported ill in the follow-up year	Partial effect	Short-term follow-up
<b>Munz</b>	Missouri, USA	2001	Customers/sales representatives (n= 55)	<b>Individual and Organizational</b> (self management training)	24	4	3	Average percent reduction in absenteeism	Clear effect	No random allocation No long term follow-up.
<b>Eriksen</b>	Finland	2002	Post office employees (n=189)	<b>Relaxation</b> (physical exercise)	344	12	12	Frequency and duration of sick leave during the last 30 days	No effect at 3 and 12 months	Selective loss to follow-up
			Post office employees (n=165)	<b>Relaxation</b> (integrated health programme)	*	†	†			
			Post office employees (n=162)	<b>Cognitive-behavioural</b> (stress management test)	*	†	†			
<b>Jackson</b>	USA	1983	Nursing and clerical employees (n=66)	<b>Organizational</b> (participation in decision making)	60	3	6	Frequency of absenteeism episodes, defined as any number of consecutive days of absence	No effect	Selective loss to follow-up Short term follow-up
<b>Toivanen</b>	Finland	1993	Hospital cleaners (n=25)	<b>Relaxation</b>	25	3	6	Sickness absenteeism during intervention and follow-up period	Similar effect between control and intervention group	Short-term follow-up
<b>Kawakami</b>	Japan	1997	Electrical company workers (n=79)	<b>Organizational</b> (Promotion of "on the job" training and standardization of the process)	108	52	24	Proportion of sick leave days recorded in the past year: None; 1-5 days; > 6 days	Small effect	No randomization Selective loss to follow-up
<b>Murphy</b>	USA	1988	Municipal highway maintenance workers (n=16)	<b>Relaxation</b> (Biofeedback)	76	24	18	Number of instance an employee was absent regardless of duration; Monday or Friday absences; Hours absent with pay; Supervisory ratings of employee attendance	Clear effect at 12 months following training; No effect at 18 months following training	Use of archival data
<b>Maes</b>	Netherlands	1998	Municipal highway maintenance workers (n=21) Manufactory of household goods workers (n=134)	<b>Relaxation</b> (Muscle relaxation) <b>Individual and organizational</b>	*	†	†	Percentage of absenteeism calculated every half year (number of days absent in a half-year period/hr) * 100	Clear effect	Many participants lost during follow-up
<b>Peters</b>	USA	1999	Maintenance employees (n=26)	<b>Cognitive-behavioural</b>	24	10	3	Rate of absenteeism	No reduction in rates of absenteeism between pre and post-treatment	No long term follow-up

(\* One control group was used for all comparisons

(†) Equal duration



outcomes or because they did not assess absenteeism measures or because they were observational studies. The remaining nine studies (Table 1) met the selection criteria and were included in the systematic review. No study received a score below 6/10 (mean score: 8.2, range: 6-10).

## Results

Table 1 reports the characteristics of the nine selected trials, which reported different absenteeism measures and follow-up of different lengths. Four studies [15-18] reported results limited to a follow-up period of six months at the most, while other studies had follow-up ranging from 12 to 36 months. Three studies compared more than one programme with a reference group [19-21], whereas in the remaining studies only one intervention was evaluated.

Studies that reported a short (i.e. six months at most) follow-up showed contrasting results for the rate of absenteeism. In Munz's study a higher average reduction in absenteeism was present in the intervention group (24%) compared to the control group (7%). This study assessed absenteeism reduction 3 months after the intervention [15].

Results provided by Jackson's study showed that absence frequency after 3 and 6 months of follow-up was similar between control and intervention groups, suggesting that the stress management programme was not effective. The results are reported as means and standard deviations (SD) of days of illness. At the pre-test, C=1 (SD=0.9), while the mean for the intervention group (I) was 1.1 (SD=1.2); at three months C=1.2 (SD=1.0), I=1.1 (SD=1.1) and at six months, C= 0.7 (SD=0.8), I=0.9 (SD=1.0). In this study the number of participants differed substantially between the pre-test and the following post-tests [16].

Toivanen analysed the effect of a stress programme that lasted only 3 weeks. The results show that sickness absenteeism during the intervention and follow-up period were equivalent between the intervention and the control group [17].

The study by Peters et al. had a follow-up of three months and evaluated the effects of a worksite stress management programme; results showed that there were no significant changes in absenteeism reduction from pre-treatment to post-treatment, but the authors did not provide any quantitative data to support it [18].

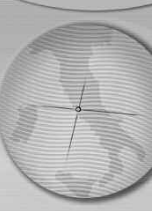
Again, studies that considered a longer follow-up period did not produce clear-cut results.

Rahe reported results in terms of days of illness over the 12 months of follow-up. Workers of two different workplaces were enrolled in a full intervention (FI), a partial intervention (PI) or a wait-list control (C). Results showed a slight reduction in absenteeism for illness between FI, PI and C: the median (range) of days of illness was 5.0 (0-180) for FI, 6.0 (0-362) for PI and 7.0 (0-50) for C among computer industry employees. Values among city government participants were 5.5 (0-73) for FI, 6.0 (0-182) for PI and 10.0 (0-180) for C [19].

Eriksen reported that there was no significant effect of interventions on self reported sick leave both the short (3 months) and long term (12 months). The study compared three different interventions programmes, consisting of physical exercise (PE), integrated health programme (IHP) and a stress management test (SMT) with a control group (C). At three months, the following results in terms of mean and confidence intervals of days of sick leave were reported: C=1.70 (0.97-2.22) PE=0.65 (0.21-1.10), IHP=1.43 (0.72-2.15), SMT=1.27 (0.55-2.00). At one year means and confidence intervals were: C=2.04 (1.01-3.07), PE=2.31 (0.89-3.74), IHP=1.23 (0.24-2.23), SMT=2.56 (1.11-4.00) [20].

In a 12-month stress programme intervention, Kawakami shows a reduction in absenteeism, calculated in days of sick leave, although it was not significant. The proportion of participants who had 1-5 days of sick leave in one year was 52% in the treatment group before the intervention, 61% at the end of the stress programme and 34% one year later. The reference group values were 53% before the intervention, 37% at the end of the stress programme and 37% one year later [22].

Murphy analysed the effects of two different stress programmes, biofeedback and muscle relaxation training, compared with a control group. He studied their effects 12 and 18 months following training relative to a pre-training assessment. Participants in the muscle relaxation training (but not those in the biofeedback group) had significantly lower absenteeism rates in the year immediately following the intervention relative to the control group. Beyond the first post-training year, differences were not evident. After 18 months, the absence frequency, calculated as mean (SD) of days of sick leave, was lower in the reference group compared to the intervention groups. Means were 2.08 (SD=2.40), in the control group, 2.43 (SD=2.38) in the muscle relaxation group and 2.11 (SD=2.71) in the biofeedback group [21].



The findings provided by Maes shows that before the intervention the percentage of absenteeism in the experimental group was 15.8%, as compared with the 14.3% in the control group. At the end of the programme, absenteeism in the intervention group had decreased to 7.7% (vs. 9.5% in the control group). Thus, there was a decrease in absenteeism of 8.1% in the experimental group and a decrease of 4.8% in the control one, suggesting that the stress programme was clearly effective [23].

### Discussion

Our systematic review shows a great variability in the effectiveness of stress management programmes on absenteeism rates. Indeed, some studies showed an effect, whereas other studies did not. In the short-run, the interventions with a longer duration, like those carried out by Murphy, Kawakami and Maes, were associated with a greater effectiveness. The results are still contrasting, because of the heterogeneity of both the interventions and the study characteristics.

The variability of results may also derive from the different programmes carried out in the studies (individual, relaxation, organizational) that have a different impact on absenteeism outcome.

A relevant factor contributing to the variability in programme effectiveness was the duration of the intervention. Thus, in order to decrease absenteeism, it may be necessary that interventions aimed at managing work-related stress in the workplace are sustained for a long and continuous period. For example the impact of adverse working conditions on physical illness may become more apparent over a long period of time [7]. Furthermore, a stress management programme aimed at reducing absenteeism, may be most useful as an adjunct to interventions aimed at organizational change, for example increased participation in decision making or improved worker autonomy [21]. It is also known that continuous and more extensive intervention is required to produce permanent and broader effects, particularly for interventions at the individual level [23].

The selected studies show some limits in relation to: lack of random allocation (Munz), selection of participants (Jackson), subjects lost to follow-up (Kawakami) but in particular studies were heterogeneous for lengths of follow-up.

It is important to underline that the positive effect on absenteeism reduction in most of the studies, may be partly due to the Hawthorne effect on worker's behaviours, altered because they knew that they were being studied.

Because of the heterogeneity of the outcomes presented in these studies, our results lack a quantitative analysis focused on a comparable measure of absenteeism.

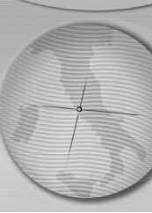
Nevertheless, the findings of our study represent a first original attempt to perform a systematic evaluation on the effectiveness of stress management programmes in terms of absenteeism reduction.

We suggest that future studies devoted to deepening our preliminary results should focus on different stress management programmes, repeated more times (for example two times every year), taking into consideration the varying effectiveness of these programmes over time.

Future research could also focus on the economic evaluation of stress management programmes in work settings, with particular attention being paid to the possible cost reduction linked to the decrease in absenteeism in order to also promote organizational productivity.

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