

Workplace policy and management practices to improve the health of employees

Evidence Review 1

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Executive summary

The National Institute for Health and Care Excellence (NICE) has been asked by the Department of Health to develop guidance on management practices to improve the health of employees, with a particular emphasis on the role of line managers and organisational context. The guidance will cover support for managers, their training, and awareness of employee health issues including managing sickness absence, as well as policies and the organisational context.

The Institute for Employment Studies (IES) in partnership with The Work Foundation (TWF) and Lancaster University have been contracted to undertake a series of evidence reviews of relevant effectiveness and qualitative studies and an economic analysis to support the production of this guidance.

This report is the first of these evidence reviews. It covers studies which examine the effectiveness of interventions taken by supervisors that could enhance the wellbeing of the people they manage. Subsequent reviews will focus on the effectiveness of organisational interventions and qualitative research about the workplace factors that facilitate or constrain the ability of line managers to enhance the wellbeing of the people they manage.

Method

It was agreed with NICE that a joint search strategy would be adopted for all three research questions which would include:

- A search of key literature databases
- A search of the websites of relevant organisations
- Citation searches of material included in the reviews
- A review of material submitted through the NICE Call for Evidence
- Writing to any known researchers and experts in the field not already contacted during the Call for Evidence to ask for relevant material.

All the papers were reviewed against agreed inclusion and exclusion criteria. Included studies were those that had an experimental or observational quantitative or economic design that were published in English since 2000, set in an OECD country which examined a workplace intervention, policy or practice at supervisory level which directly helped supervisors identify, promote or support employee health and wellbeing. Interventions or support that employees access on their own, statutory provision or interventions to promote physical activity, mental wellbeing and smoking cessation in the workplace, and to manage sickness absence are excluded.

The 10,113 titles and abstracts identified through the initial search process were screened through a two-stage process to identify papers that should be considered for full paper screening, using a checklist based on the inclusion/exclusion criteria. Articles were identified at this stage as being relevant for Review Question 1, 2 or 3.

The full papers of all the studies that came through the initial screening process were ordered and by the time of writing 439 of the 513 identified for full paper screening had been retrieved. Retrieved papers were appraised by two members of the review team using the full inclusion/exclusion checklist to assess the content of the articles and whether they should be included in the review (see Appendix 2).

Of the 527 papers identified for full paper screening a total of 137 have been screened. These include all those identified in the earlier search process as potentially relevant to Review Questions 1 and 2 and an additional 30 which were uncategorised. During the screening process five papers have been identified for inclusion in this review and additional 14 for inclusion in the review of evidence addressing Review Question 2 and 31 for Review Question 3.

The five papers identified for inclusion in this review were assessed for quality and the data extracted and presented in an evidence table by two separate members of the review team. Papers were assessed using a checklist based on the quality assessment in the NICE Public Health Guidance Methods Manual (NICE, 2012). Depending on how they met the criteria behind the checklist papers were graded either: '++', '+' or '-'.

Findings

Four of the five studies included in this review indicate that a positive relationship between supervisor and supervisee enhances employee wellbeing. However, the studies tend to focus on either one particular aspect of the supervisor/supervisee relationship, or a particular aspect of employee wellbeing or a particular group of workers and are of limited applicability to the UK. Therefore it is difficult to draw

general conclusions on the basis of this evidence alone. We expect more comprehensive and illuminating evidence to be generated by the next two reviews.

One study (Logan and Ganster, 2005) found that a supportive supervisor could positively affect the job satisfaction of employees who were given more control over aspects of their jobs. However the study did not find any positive effect on other wellbeing measures (such as depression and anxiety). Nielsen et al. (2010) found that employees working for managers who had been trained in implementing an organisational change (concerning the introduction of team working) had higher levels of job satisfaction after the change than those who had managers who had not received the training.

Evidence statement 1

There is moderate evidence from two studies^{1 2} that the impact of organisational changes on employees' job satisfaction can be enhanced by positive supervisory intervention.

One (+) controlled quasi-experimental study¹ that when making an organisational change such as the introduction of team-working in a Danish care home, the job satisfaction of employees can be enhanced by the suitable training of managers to help them understand the change and how best to implement it (Effect .34 $p < 0.5$). One North American (+) RCT study² found that positive supervisory support can act as a catalyst in changing employees' perceptions of an organisational change and enhance job satisfaction ($\Delta R^2 = .05$, $p < .01$), but does not have a positive effect on stress-related outcomes such as anxiety and depression.

The evidence is only partially applicable to the UK because of the different settings and the outcomes relate to job satisfaction rather than more central well-being measures.

¹ Nielsen et al. 2010 (+)

² Logan and Ganster 2003 (+)_

Another study (Wager et al. 2003) found that negatively perceived supervisory style had a detrimental affect on the wellbeing of the people they managed (as measured by blood pressure) and could therefore be seen as a workplace stressor. In this study the change between being supervised by a negatively perceived supervisor and a positively perceived supervisor could be seen as an intervention.

Evidence statement 2

There is weak evidence from a UK (-) controlled quasi-experimental study¹ based on a small sample that female healthcare assistants working in UK hospitals, care homes and residential homes under a less favourably perceived supervisor experienced significant increases in blood pressure (12mmHg (systolic) ($p=0.001$) and 6mmHg (diastolic) ($p=0.038$)), compared with when they worked under a favourably perceived supervisor or on a non-working day. While this study appears to be directly applicable to the UK, being set in an unspecified number of UK hospitals, nursing and residential homes, there are concerns about its quality which need to be taken into account.

¹Wager et al. 2003 (-)

The fourth study (Zohar and Luria, 2003) focused on safe working as a measure of wellbeing. It examined safety behaviour in three production workplaces in Israel and found that greater levels of interaction between supervisors and supervisees about safety issues resulted in higher levels of safe working and an enhanced safety climate.

Evidence statement 3

There is moderate evidence from a (+) 'before and after' longitudinal study¹ set in Israel that providing feedback to supervisors on their interactions concerning safety with their subordinates on workers' safety behaviour in three production plants can result in significant positive changes in workers' safety behaviour and safety climate scores. This evidence does not appear to be applicable to the UK because it is set in Israel where health and safety systems and cultures are different from that in the UK and the workforce is predominantly male and in one case mainly non-native speaking migrants.

¹Zohar and Luria 2003 (+)

The final study (Uegaki et al. 2011) examined the impact of a low level intervention between supervisors and the women who they managed and who were on maternity leave and found no positive impact on the women's wellbeing. This may have been a result of the lack of intensity of the intervention (one phone call six weeks after their birth), the outcomes measures used and/or the nature of the people in the study.

Evidence statement 4

There is moderate evidence from a (+) cost-utility analysis set in the Netherlands¹ that a low intensity intervention by supervisors in the form of an additional telephone contact had no effect on the wellbeing of 500 employees on maternity leave from a mix of companies. This evidence appears to be not applicable to the UK. The maternity leave regime in the UK is significantly different to that in the Netherlands and the intervention would not be appropriate

¹ Uegaki et al. 2011 (+)

Finally, two of the studies also provide some fairly weak evidence that middle managers can play a role in bolstering supervisory interventions and thereby enhancing employee wellbeing.

Evidence statement 5

There is weak evidence from two studies ^{1 2} that show that support for interventions at supervisory level by middle managers can have a positive effect on employee wellbeing. In each study middle management support was seen as a contributory factor, although detailed results of the impact they had are not reported. The evidence is only partially applicable to the UK because of the different settings and the lack of full data.

¹ Zohar and Luria 2003 (+)

² Nielsen et al. 2010 (+)

1 Introduction

The National Institute for Health and Care Excellence (NICE) has been asked by the Department of Health to develop guidance on management practices to improve the health of employees, with a particular emphasis on the role of line managers and organisational context. The guidance will cover support for managers, their training, and awareness of employee health issues including managing sickness absence, as well as policies and the organisational context. It will be based on the best available evidence and will provide recommendations for good practice for line managers, professionals, commissioners and managers with public health as part of their remit working within the NHS, local authorities and the wider public, private, voluntary and community sectors.

The Institute for Employment Studies (IES) in partnership with The Work Foundation (TWF) and Lancaster University have been contracted to undertake a series of evidence reviews of relevant effectiveness and qualitative studies and an economic analysis to support the production of this guidance.

This report is the first of these evidence reviews. It covers studies which examine the effectiveness of interventions taken by supervisors that could enhance the wellbeing of the people they manage. Subsequent reviews will focus on the effectiveness of organisational interventions that aim to support line managers to enhance the wellbeing of the people they manage and a qualitative review of the workplace factors that facilitate or constrain the ability of line managers to enhance the wellbeing of the people they manage. We will also analyse the available economic data on the subject.

1.1 Background

The health of the working population is vital to the economy and to society, but due to changing demographics of the workforce, western societies are facing great challenges to maintain economic growth and competitiveness. The workforce is aging with more people living with a longstanding health problem or disability from which musculoskeletal disorders (MSDs) and mental health disorders account for more than half of all short and long-term disability

(www.realising-potential.org/stakeholder-factobox). In the UK, around one in three adults (30 per cent) reported in 2009 that they had a longstanding illness or disability, compared with around one in five adults (21 per cent) in 1972 (ONS No 41; 2009). It is likely that chronic disease rates will continue to rise; much of this is due to an increase in poor life style factors, such as poor diet, smoking and lack of exercise.

Ill health represents a major economic burden for society due to increased healthcare costs, loss in productivity and sickness absence. Although absence rates have been falling in recent years, it has been estimated that annual costs of sickness absence for UK businesses is nearly £14 billion a year (Vaughan-Jones & Barham 2009). In addition, it is likely that presenteeism, defined as reduced performance and productivity due to health while at work, could cost employers two to seven times more than absenteeism (Hemp 2004).

It has been recognised that improved workplace health has the potential to make a significant contribution to the economy, to public finances and to reducing levels of disease and illness in society (Waddell and Burton 2006). Employers play a key role in helping to protect health and prevent future ill health of working population and the NICE Public Health Guidelines (2009) recommend strategic and coordinated approach to promote employees' mental health wellbeing.

The health of employees is a major factor in an organisation's competitiveness. Employees in good health can be up to three times as productive as those in poor health; they can experience fewer motivational problems; they are more resilient to change; and they are more likely to be engaged with the business's priorities (Vaughan-Jones & Barham 2010). In Dame Carol Black's review of the health of Britain's working age population it was calculated that improved workplace health could generate cost savings to the government of over £60 billion – the equivalent of nearly two thirds of the NHS budget for England (Black 2008).

An employer's attitude to workplace health is likely to depend on the culture of the organisation and their motivation for investment. According to a large world-wide survey involving 378 organisations (GCC 2013), the main reasons for employers developing wellness strategies were improving employee health (69 per cent), improving work engagement (68 per cent) and also reducing sickness absenteeism (36 per cent) and increasing productivity (27 per cent).

Workplace interventions are usually grouped in two main categories:

- Interventions that aim to improve health safety or managing ill-health of employees, such as sickness absence management programmes, vocational rehabilitation, and return to work schemes.
- Health promotion programmes, which focus on overall wellbeing, for example smoking cessation, healthy diet and exercise programmes (PriceWaterHouseCoopers LLP Feb 2008).

Reasons why employers invest in workplace health can be:

- legal (to comply with health and safety requirements)
- economic (reducing costs or add value to the business) and/or
- ethical (the sense that is the right thing to do) (Vaughan-Jones & Barham 2010).

It is, however, difficult for employers to measure the extent to which a particular workplace health intervention has had an impact. There is surprisingly little evidence on what the total costs, both direct and indirect, are to business (Bevan 2010). That so few businesses spend time calculating the costs could be one explanation for why relatively few of them are investing in employee health measures (Black 2008). Similarly, academic systematic reviews examining the effectiveness of interventions on sickness absence management and job retention have found programmes to be effective, but may be highly biased due to small number and size of the studies and their moderate or low quality (Palmer et al. 2012; Hamberg-van Reenen et al. 2012).

Workplace health interventions are more likely to be effective in organisations that promote good quality work (Vaughan-Jones and Barham 2010) and producing good quality work is beneficial for physical and mental health resulting in better self-esteem and quality of life (Waddell and Burton 2006). Promoting good quality work involves giving consideration to issues of working practices and job design (Bevan 2010). The Macleod Review on employee engagement (July 2009) has revealed how this 'feeling good' factor is strongly influenced by good leadership. The main factors influencing good quality of work are:

- leaders who support employees see where they fit into the bigger organisational picture
- effective line managers who respect, develop and reward their staff
- consultation that values the voice of employees and listens to their views, and
- concerns and relationships based on trust and shared values.

While there are a relatively large number of research studies examining the link between management practices and employees' health, systematic evaluation of the best approach, however, is lacking. As more employers recognise the need to promote wellbeing at work it is important that they have access to guidelines which help them to provide healthy and good quality working environments in a cost effective way and using evidence-based interventions.

1.2 Aim of this review

The aim of this first review is to answer the following central research question:

What workplace policies, practices or interventions implemented by line managers in employing organisations are effective and cost effective in enhancing the wellbeing of the people they manage?

In addition we sought to identify and review any evidence that covered an additional secondary question:

- Are there actions or activities by line managers which discourage or hinder the health and wellbeing of employees?

We were looking for evidence covering line managers (ie an employee with direct responsibility for the performance, development and/or welfare of one or more other employees) at any level and their impact on employee wellbeing. Wellbeing was defined as the emotional, physical and mental health and happiness of individuals as it is affected by a number of factors at the workplace which could include organisational, managerial, social and physical dimensions. To be included in the review, studies had to examine the effectiveness of an intervention (or workplace policy or practice) by means of a comparison with a control group, or through a longitudinal approach (or ideally both).

In subsequent reviews we will examine two additional research questions. The first which is also an 'effectiveness review' requiring a quasi-experimental or longitudinal approach, covers:

What workplace interventions, policies or practices implemented by employing organisations, are effective and cost effective in supporting line managers to enhance the wellbeing of the people they manage? Such interventions could include organisational culture, leadership styles, management practices and support from occupational health departments which affect the ability of line managers to identify employees' health and wellbeing support needs and provide them directly or indirectly with the support to meet those needs.

The final review examines Review Question 3, which is a broader question than those covered by the first two reviews and will include qualitative studies. The third review question is as follows:

What workplace factors facilitate or constrain the ability of line managers to enhance the wellbeing of the people they manage?

1.3 Structure of the report

This report covers:

- The methodology we adopted to conduct the review
- The findings from the review
- A discussion of the evidence.

In addition a series of Appendices provide further information on our approach and a bibliography of the studies included and excluded from this review.

2 Methodology

In this chapter we set out our approach to conducting this review.

2.1 Overall search strategy

It was agreed with NICE at the outset that a joint search strategy would be adopted for all three research questions which would cover:

- Effectiveness studies (for Review Questions 1 and 2)
- Qualitative studies (for Review Question 3)
- Economic studies (for the economic review and modelling report)

The search for relevant evidence covered a number of elements:

- A search of key literature databases
- A search of the websites of relevant organisations
- Citation searches of material included in the reviews
- A review of material submitted through the NICE Call for Evidence
- Writing to any known researchers and experts in the field not already contacted during the Call for Evidence to ask for relevant material.

2.2 Inclusion and exclusion criteria

All the papers were reviewed against agreed inclusion and exclusion criteria. The agreed criteria are set out below.

2.2.1 Inclusion criteria

Populations included:

- All adults over age 16 in full or part-time employment, both paid and unpaid

- All employers in the public, private and 'not for profit' sectors who employ at least one employee.

Questions to be addressed by included studies:

- What is the role of the organisational culture and context in supporting line managers, and in turn their employees? What is the role of organisational policy and processes? *[Covered by Review 2]*
- How can line managers promote the health and wellbeing of employees? Which interventions or policies are most effective and cost effective? *[Covered by Review 1]*
- Are there actions or activities by line managers that discourage or hinder the health and wellbeing of employees? How can line managers support and motivate employees? *[Covered by Reviews 1 and 3]*
- How can line managers be best equipped to identify any employee health and wellbeing issues? How can line managers identify and support distressed employees? *[Covered by Reviews 1, 2 and 3]*
- How can high-level management promote a positive line management style that is open and fair, that rewards and promotes positive behaviours and that promotes good working conditions and employee health and wellbeing? *[Covered by Review 2]*
- How can line managers be best supported and provided with good line management themselves? *[Covered by Reviews 1 and 2]*
- Which types of support and training for line managers are effective and cost effective? *[Covered by Review 2]*
- What is the role and value of occupational health services in supporting line managers? Are these services effective and cost effective? *[Covered by Reviews 1 and 2]*
- What is the business or economic case for strengthening the role of line managers in promoting the health and wellbeing of employees? *[Covered by Reviews 1 and 2]*

Locations included:

- Developed/OECD countries
- Workplace settings.

Time period considered:

- 2000 onwards for effectiveness and cost-effectiveness primary studies and reviews.

Study types included:

- Experimental quantitative studies including:
 - Before and after studies
 - Non-randomised controlled trials (RCT)
 - Randomised control trials (RCT)
- Observational quantitative studies:
 - Before-and-after studies
 - Case-control studies
 - Cohort studies
 - Correlation studies
 - Cross-sectional studies
 - Interrupted time studies
- Economic studies:
 - Cost-benefit analyses
 - Cost-effectiveness analyses

2.2.2 Exclusion criteria

Excluded population groups

- Self-employed individuals
- Sole traders
- Unemployed individuals.

Interventions and policies excluded

- Intervention or support that employees access on their own, without input from the employer, organisation or line manager
- Statutory provision to employees
- The effectiveness of specific interventions to promote physical activity, mental wellbeing and smoking cessation in the workplace, and to manage sickness absence and the return to work of those who have been on long-term sick leave.

Locations excluded:

- Developing or non-OECD countries

Study types excluded:

- Non English language studies
- Qualitative studies

2.3 Searching literature databases

A series of databases were searched by an Information Scientist at the Lancaster University library between 19 October and 4 November 2013, see Table 2.1.

Table 2.1: Literature databases searched

Database Name	No. of title and abstracts downloaded to EndNote database
MEDLINE	1,998
PsycINFO	2,999
Academic Search Complete	1,067
Business Source Premier	1,858
ABI Inform	102
Proquest Digital Dissertations	62
EconLit	106
Social Policy and Practice	340
Web of Science	1,500
EMBASE	73
	10,105

Source: IES/Work Foundation/Lancaster University, 2013

The search strategies were designed to cover: the workplace, the role of line managers and supervisors, health and wellbeing, organisational culture, and management style. Examples of the strategies used are set out in Appendix 1 and the results set out in Table 2.1. The titles and abstracts identified through the searches were recorded in an EndNote database.

2.3.1 Initial screening

The titles and abstracts identified through the search were screened through a two-stage process to identify papers that should be considered for full paper screening.

Initial sift (Sift 1)

The titles and abstracts of the 10,105 papers identified through the search were initially screened at by the Information Scientist at Lancaster University using the population, setting and relevance inclusion and exclusion criteria and to exclude studies not published in English and those that passed identified for further consideration. The first 200 papers identified through the initial search were screened by a second member of the review team to ensure that the inclusion/exclusion criteria were being applied consistently and no discrepancies were identified. This initial sift resulted in 2,286 papers being identified for more detailed title and abstract screening.

2.3.2 Second sift (Sift 2)

The titles and abstracts of the 2,286 references selected for further consideration were screened in more depth by five members of the review team at IES and the Work Foundation, using an inclusion/exclusion checklist based on the Public Health Guidance Methods Manual (NICE, 2012) (see Appendix 2). Half the references were screened by two different researchers and any differences resolved in discussion with a third. As a result of this process, 505 references were identified for full paper screening. At this point papers were categorised as relevant to either Review Question 1, 2 or 3, although 30 failed to be categorised.

2.3.3 Full paper screening

The full papers of all the studies that came through the initial screening process were ordered and by the time of writing 439 of the 513¹ identified for full paper screening had been retrieved². As part of the retrieval process the authors of papers unobtainable through the Lancaster University library were contacted and asked to send a copy of their paper to the research team. Retrieved papers were appraised by two members of the review team using the full inclusion/exclusion checklist to assess the content of the articles and whether they should be included in the review (see Appendix 2). Where there was a discrepancy between the assessment of the two reviewers, a further review was conducted by an additional member of the team. The progress of papers through the full paper screening process was tracked using a spreadsheet adapted for this project from one devised by the University of Kent.

The spreadsheet was used to identify:

- the first exclusion reason for those papers excluded; and
- for which Research Question the paper was relevant.

2.4 Website searches

In addition, the following websites were searched for relevant material and seven items were identified as potentially meeting the inclusion and exclusion criteria and allocated for full paper screening.

UK

- Acas
- British Chambers of Commerce (BCC)
- British Psychological Society

¹ The 513 figure include seven additional papers identified through website searching and one through the call for evidence.

² Where possible, the research team have written to the authors of papers unobtainable through Lancaster University library to request a copy of their full paper. If any of these papers prove to be relevant for Research Question 1 they will be included in a revised version of this review.

- Centre for Employment Studies Research
- Centre for Mental Health
- Chartered Institute of Environmental Health
- Chartered Institute for Personnel and Development
- Chartered Institute of Management
- Department for Work and Pensions
- Engineering Employers Federation
- Health and Safety Executive
- Institute for Occupational Safety and Health
- London Health Commission
- NICE (including former Health Development Agency document search) and NICE Evidence
- Oxford Health Alliance
- Public Health Observatories
- Scottish Government
- UK Commission for Employment and Skills / Investors in People
- Welsh Government
- Xpert HR

International:

- EU-OSHA
- Eurofound
- EuroHealthNet
- European Commission
- Finnish Institute of Occupational Health
- Institute for Work and Health
- International Commission of Occupational Health
- Liberty Mutual Research Institute for Safety
- Organisation for Economic Co-operation and Development

- The National Institute for Occupational Safety and Health
- World Health Organisation

Seven reports and papers were identified as potentially relevant to at least one of the review questions and a copy obtained for full paper screening. None were identified as relevant for Review Question 1.

2.5 Citation searching

A further element of the search process involves checking whether the papers included in each review have been cited by subsequent researchers and screening those references to ensure the review covers the most up-to-date material. Citations of the five papers included in this review have been searched and 42 further papers screened but none of them met the criteria for inclusion in this review.

2.6 Call for Evidence

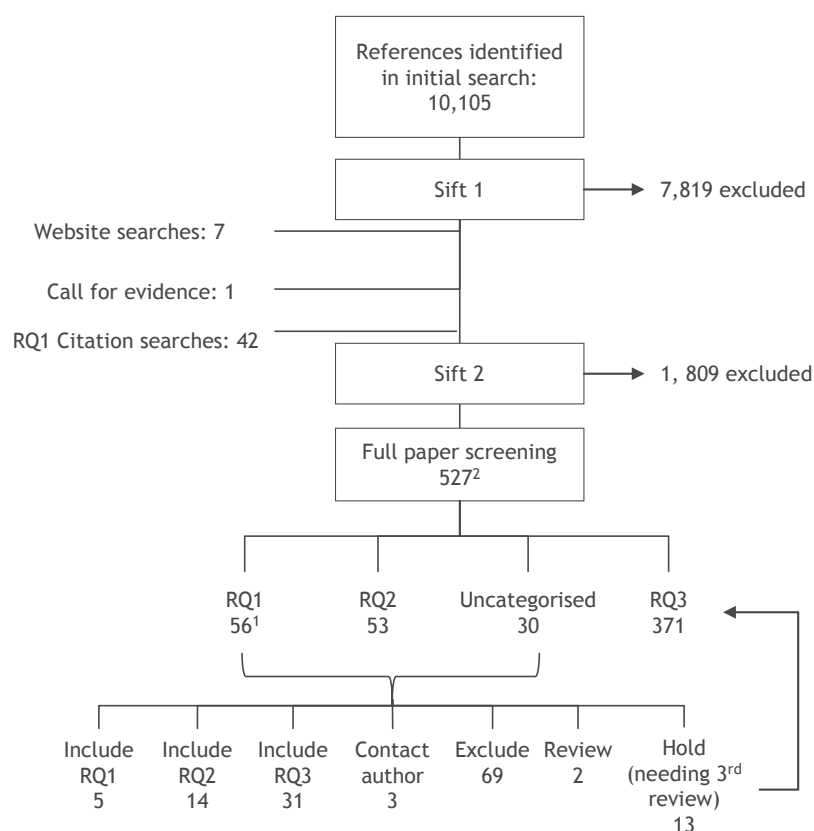
A further process involved a Call for Evidence issued by the NICE review team. The call was issued on 13 September 2013 and closed on 16 October 2013 and asked for interested parties to send in evidence of relevance to the reviews. This material has been reviewed by the research team and one of the studies identified was found to be relevant to this Research Question, screened following the same process outlined above and subsequently included in this review (along with an associated paper about the same study).

2.7 Outcome of the search process

Of the total number of 527 papers so far identified for full paper screening, 129 have been screened. These include all those identified in the earlier search process as potentially relevant to Review Questions 1 and 2 and 30 which were uncategorised, plus papers identified through the website search, the call for evidence and the citation search as relevant for Review Question 1 (see below). During this screening process five papers were identified for inclusion in this review and an additional 14 for inclusion in the review of evidence addressing Review Question 2 and 31 for Review Question 3.

The searching and screening process is summarised in Figure 2.1.

Figure 2.1: Outcome of search process for Review Question 1



1. Includes one economic paper
2. Includes 5 papers still in the process of being obtained at the time of writing and 13 books (RQ3)

Source: IES, TWF, Lancaster University

2.8 Data extraction

The five papers identified for inclusion in this review were assessed for quality and the data extracted and presented in an evidence table. The evidence from each paper was extracted and the quality of the paper appraised by a member of the IES/TWF review team and then checked and re-appraised by another. The narrative statements of evidence were written by a third member of the team.

2.8.1 Quality appraisal

Papers were assessed using a checklist based on the quality assessment in the NICE Public Health Guidance Methods Manual (NICE, 2012). As a result papers were graded either:

- ++ All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter
- + Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter and
- Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

The checklist is included in Appendix 2.

2.8.2 Data extraction

For each paper the evidence table, which follows the format set out in Public Health Guidance Methods Manual (NICE, 2012) summarises:

- the key research aims
- the study quality rating
- the research design and methodology
- the intervention (if applicable) and focus of the study
- the findings that contribute to the research questions
- limitations and gaps
- summary information about authors, publication etc.

2.9 Evidence synthesis

The results of the data extraction and quality assessment for each of the included effectiveness studies are presented in a narrative summary and an evidence table (Chapter 3). The findings from studies have been synthesised and where appropriate grouped thematically and an evidence statement generated for each theme (Chapter 4).

The synthesis and evidence statements were initially drafted by one member of the review team, circulated to all other members of the team and revised on the basis of comments received. At this point the relevance of the findings to the UK context was also assessed, based on the following criteria:

- The population involved

- The setting, including the country or countries and type of workplaces in which the study took place
- The intervention and whether it would be appropriate for the UK
- The reported outcomes.

2.10 Excluded studies

Appendix 4 provides the reference details of 69 excluded studies from the full paper screening for Review Question 1. Studies were excluded because they failed to meet at least one of the inclusion criteria. As soon as they failed to meet one of the criteria they were excluded. In the appendix the references are ordered by the criterion by which they were excluded. Five were excluded because they did not cover the right population (eg were not employees) but these may have failed against other criteria too. Four were in the wrong setting (ie not based in the OECD or a workplace), 18 did not have sufficient methodological information or contained insufficient information about the method used and 25 were rejected on grounds of relevance, eg they did not study the influence of line managers' actions on the health and wellbeing of the people they managed and a further 10 on the grounds that they did not examine a specific supervisory-level intervention. In seven cases we did not have the full paper and the author was unobtainable. Fifteen papers still need a third screening but have been assessed as not relevant to Review Question 1.

3 Findings

A total of five studies met the criteria for inclusion in this first review and focused on workplace policies, practices or interventions implemented by line managers in employing organisations that contained evidence about their effectiveness or cost effectiveness in enhancing the wellbeing of the people they manage. The studies are summarised below and the implications of the findings discussed in Chapter 4.

3.1 Summaries of the included studies

Logan and Ganster (2003)

This (+) study involves a randomised control trial designed to assess a workplace control intervention in a large trucking company which also assessed the role that supervisory support plays as a catalyst in changing employees' perceptions of workplace control.

Some 67 project managers who managed geographically dispersed profit centres in a large trucking company operating in the USA, Canada and Mexico, took part in the study. In three of the five organisational regions project managers were assigned a control number and half (N = 34) from each region were then chosen for the intervention group through the use of a random number table. The rest (N = 33) were assigned to a non-intervention or control group (although three of these subsequently left the company and were excluded from the study).

The intervention group received a 10-hour training session delivered by three members of the maintenance department and one of the researchers. Three areas of control were addressed in the training:

- Project managers received training in dealing with outside vendors and the terminal shops and given discretion to decide which to use to provide their maintenance needs.
- Control over night-time road service coverage: project managers felt they had little control when it came to helping their drivers when they had breakdowns outside business hours. To give the project managers more control, two night-time road

service dispatchers were trained and designated to deal with project managers' needs.

- Third area of control dealt with the project managers' individual project profit and loss statements. The project managers were held responsible for costs but did not feel competent to audit their maintenance expenses. They received training on how to audit expenses and make adjustments and corrections.

Survey data were collected from the project managers in both intervention and control groups before the training took place and approximately 17 weeks after the training intervention was completed covering:

- overall control
- supervisory support (using a four-measure support from supervisor scale (Caplan et al., 1975))
- somatic complaints
- depression
- anxiety
- job satisfaction.

The data were analysed using hierarchical multiple regression modelling controlling for a range of variables such as age, experience and work demand (measured by the number of trucks under the project managers' control).

Outcomes

The study found significant changes in control perceptions and job satisfaction, but only for managers who initially had supportive supervisors. Social support interacted with the intervention affecting overall control ($\Delta R^2 = .07$, $p < .01$, in other words the difference in R^2 score (which measures the 'fit' of the multiple regression model) for the intervention group with supervisory support at .63 was .07 higher than that of the control group) and thus moderated the effect of intervention on levels of perceived control. The intervention also produced improvements in job satisfaction ($\Delta R^2 = .05$, $p < .01$), but had no main effects on either control or stress-related outcomes such as depression or anxiety.

Follow-up telephone interviews seven weeks after the intervention found that all project managers reported they remembered what they were taught during the training sessions and that, to varying degrees, they incorporated the new options into their work routines.

Limitations of the study

The study was rated '+', although the sample sizes involved are relatively small.

There is a possibility that the intervention was 'diffused' to members of the non-intervention group, although the authors deem this unlikely due to the geographical dispersion of the individuals involved.

The period between the intervention and the post-test measure (17 weeks) could have been an insufficient period for the intervention to have had effect on general wellbeing outcomes, although the authors think this time period was long enough.

The scaling of the control measure shifted as a result of the intervention and project managers wanted more opportunity for self-determination at work.

Applicability to the UK

This study appears to be partially applicable to the UK. It is set in a reasonably similar environment (eg the USA and neighbouring countries although one site which was located in Mexico may not be so similar to the UK) and in a haulage company. Although providing greater job control would be applicable to the UK, the precise intervention is very context specific. However the key point is that the study did not find any positive effects on primary wellbeing measures such as anxiety and depression, although increased control, plus supervisory support did have a positive effect on job satisfaction.

Nielsen et al. (2010)

This (+) controlled quasi-experimental study and two related studies (Randall et al. 2009 and Nielson K and Randall R, 2009) examine the effectiveness of a training intervention implemented among managers introducing team work in a large organisation and in particular the effect that the training had on the job satisfaction of the people they managed.

A team working intervention was introduced in two almost identical elderly care centres in a large Danish local government organisation.

The overall objective of the team implementation intervention was to make full use of employees' competencies, ensure employee involvement and empower employees to make independent decisions, ie to develop teams with some degree of self-management but with good management support.

Teams were formed by dividing existing groups of employees into smaller teams which became jointly responsible for a group of clients: team members were then jointly responsible for allocating tasks and for deciding how they should be dealt with. Regular team meetings were introduced where team members would share knowledge and experiences and come up with alternative ways of solving problems.

Before implementing teamwork, the elderly care centres were randomly allocated status as intervention (treatment) or comparison (control) group, with managers in the intervention group receiving a bespoke training programme.

A theory-driven (action learning) and evidence-based team manager training course was delivered to the managers within the intervention group. The research team carried out a thorough review of research on:

- i) teamwork,
- ii) transformational leadership behaviours that may support teamwork and change processes, and
- iii) how team managers may implement changes in their own teams (including information on the possible barriers met when implementing changes).

Based on this, internal consultants developed a syllabus and manual for the manager training course.

The training required managers to address real-life problems, so that managers would be encouraged to re-evaluate their attitudes and start thinking in new ways about their work practices. Managers were required to develop action plans to be implemented in their own teams to support the transfer of learning. The training course consisted of six days training spread over a period of six months.

Outcomes

The study took place over an 18 month period. The questionnaire data was collected from employees before the intervention and after 18 months about their perception of improved task design (increased team independence and autonomy) and team processes (increased motivation and improved social climate), as well as team effectiveness, involvement and job satisfaction (using responses to Likert scales).

Some significant differences were found between the treatment and the control group. Involvement ($p < .10$) and job satisfaction ($p < .05$) decreased in the comparison group but these increased or remained stable in the treatment group. [Involvement: Control T1 55.3 (17.0) T2 53.5 (15.7). Change: -1.90 (CI 95% -5.34, 1.54)]

Intervention: T1 58.5 (16.3) T2 62.1 (14.2). Change: 3.26 (CI 95% -0.64, 7.15). Effect: .31. Job satisfaction: Control: T1 67.6 (16.6) T2 62.7 (15.7). Change: -5.00 (CI 95% -8.49, -1.51) Intervention: T1 65.8 (15.1) T2 66.9 (15.1). Change 0.5 (CI 95% -3.42, 4.43). Effect: .35]. There was some evidence that team manager training had enhanced the effectiveness of team implementation and increased job satisfaction. Similarly, effects were found for both team effectiveness and motivation: the comparison group experienced a decrease whereas the treatment group remained stable. Contrary to expectations, interdependency increased in the control group and decreased in the treatment group. This difference was significant ($p < .05$) with a medium effect size (.39).

Separate analysis of the same data in a different paper (Nielson and Randall, 2009) indicates that at Time 2 employees' assessment of their working conditions significantly predicted employee wellbeing and job satisfaction which in turn was predicted by employees' ratings of their middle managers' active involvement in the intervention. The statistical results are not clearly reported and therefore not available.

Limitations

The authors reported problems in the implementation of the team working intervention. Employees were already functioning as teams before the intervention which could have resulted in non-significant findings. Changes in the control group could have affected the findings; the employees were responsible for a smaller number of clients and employees were given additional responsibilities. Such changes did not occur in the treatment group. In both groups, changes at the governmental level made it more difficult to implement team working because they were not allowed to use temporary staff to cover absent colleagues. This made it difficult to find time and energy to work with team implementation.

In addition further limitations were identified by review team. The randomisation process was not well-reported. Treatment and control group teams were working at the same organisations therefore it is possible that managers in intervention group may have discussed their training with their peers who were in the control group. This could have resulted in managers in the control group changing their behaviour, causing biased results.

The number of lost participants at the follow-up stage was 28 per cent in the intervention group and 46 per cent in the control group. The high number of lost participants in control group could have biased the results because those who responded might have been more motivated to participate in the study.

Applicability to the UK

This study appears to be partially applicable to the UK. Team working with supervisory support is an intervention that is relevant to the UK context. It should be noted however that the care homes are set in Denmark and run by local authorities when most are independent in the UK. Therefore the management and quality control systems may be significantly different to that in the UK. However the only relevant outcome measure was of job satisfaction (rather than prime wellbeing measures such as anxiety or depression).

Uegaki et al. (2011)

This (+) cost-utility analysis examined the effectiveness of supervisor telephone contact with 541 employees on maternity leave designed to prevent extended sick leave following maternity leave in The Netherlands.

The study took place in 15 companies (who agreed to take part out of 93 approached), comprising nine from health care; five from the service sector and one government organisation. Within the companies the study involved 416 supervisors and 541 pregnant women on maternity leave (recruited from a possible 1800-2500 working mothers invited to take part in the study).

Randomisation took place at the level of the supervisor. For each participating company, a randomisation list was computer-generated by an independent statistician. When employee participants were 35 weeks pregnant, supervisors were randomized in blocks of four where each block contained two interventions and two control group allocations. Blocks of four were chosen because of the uncertainty in how many employees of each company would participate and some companies had a small number of employees. Supervisors and participants in the control group and data entry assistants were blinded to group allocation. Blinding during the data analysis was guaranteed by means of coded patient, supervisor and company data.

A total of 265 women joined the treatment group (supervisors N = 208). The intervention involved supervisor telephone contact (STC) with the employee while she was on maternity leave. The aim of the intervention was to prevent prolonged non-treatment of health problems that could delay return-to-work (RTW) following the end of maternity leave by instigating the involvement of occupational health services 6-12 weeks earlier than in the usual situation. At six weeks post-partum, supervisors contacted their employees to conduct a standardised interview in order to identify health problems that may be barriers to RTW after the official end of maternity leave. If such health problems were identified, the support of the

occupational health services was offered. This telephone interview was in addition to the usual congratulatory telephone calls, cards and visits. Supervisors received written and oral instruction about their role as case managers and a prompt to make the intervention.

The non-treatment group (N = 276 joined the control group (supervisors N = 210)) did not receive the supervisor intervention, but in all other respects were treated the same as the intervention group.

Data were collected on health care use, sick leave and work presenteeism and health-related quality of life at various intervals including six, 12, 18, 24 and 52 weeks following the birth (varying with the type of data collected) using a survey questionnaire. Nine participants were lost in follow-up and there were 29 cases partially missing data in intervention group and 27 in control group.

The data were analysed according to the intention-to-treat principle and the study was powered at 80 per cent (implying a total of 550 pregnant women needed).

Outcomes

At the end of the follow-up period, there were no statistically significant between-group differences in quality adjusted life years (QALYs) (STC mean = 0.928, S.D. = 0.094; CP mean = 0.935, S.D. = 0.087; mean difference = -0.007, 95% CI: -0.023; 0.009).

Also, the groups did not differ significantly in terms of:

- mean number of sick leave hours (STC = 26.1, S.D. = 66.3; CP = 24.6, S.D. = 65.2; mean difference = 1.5, 95% CI: -10.1; 13.0),
- work presenteeism hours (STC = 24.1, S.D. = 36.7; CP = 20.7, S.D. = 29.8; mean difference = 3.4, 95% CI: -2.2; 9.1) or
- total productivity loss hours (STC = 50.2, S.D. = 84.2; CP = 45.3, S.D. = 77.6; mean difference = 4.9, 95% CI: -9.1; 18.9).

Limitations

The authors identified two potential sources of selection bias as a low proportion of approached companies agreed to take part and those that did may represent an optimal setting and the sample of working mothers had higher than average levels of education.

The maternity leave regime in Netherlands is different from that in the UK (women are entitled to 16 weeks full-pay under the maternity leave regime in the

Netherlands, whereas in the UK 52 weeks of maternity leave is possible). Considerably shorter maternity leave may mean that the findings are not generalisable to the UK.

The intervention (a phone call from the supervisor) was of a low intensity and more frequent contact may have had a different result.

The study population is likely to have better health than average and may have higher levels of motivation, minimising sick leave. The study reported that the sick leave rates of the study population were lower than those reported in the literature used to conceptualise the intervention. In the study, only two per cent of the women took sick leave at the end of their maternity leave versus 29 per cent in the literature. The authors stated that 'this unexpected result suggests that there may not have been a problem upon which to intervene'. It is therefore unclear whether ill-health post-pregnancy is a significant cause of sick leave and negative wellbeing.

Applicability to the UK

This study appears to be not applicable to the UK. The maternity leave regime in the UK is significantly different to that in the Netherlands. In the UK maternity leave is longer and many employers offer 'keep in touch' days which allow employees on maternity to engage with their workplace while on maternity leave and represent a far more significant intervention than the one used in this study.

Wager et al. (2003)

This (-) controlled quasi-experimental study examined the effect of different supervisor's interactional styles on workplace stress among a sample of female healthcare assistants aged between 18 and 43 working in hospitals, residential and nursing homes in the UK. It provides evidence that supervisor interactional style is a potential workplace stressor.

A sub-sample of 43 respondents were purposefully selected to take part in the study (although this subsequently fell through sample attrition to 28 people who actually took part in the study – see limitations below). The previous survey has asked about the respondents' perception of the interactional style of their supervisor (using a self-administered 47-item Likert scale). In this study participants were allocated to the 'experimental' group (N = 12) because they worked for two different supervisors on different days in the same work environment for whom they held different perceptions (a minimum of 27 point difference on the scale was required). Participants were allocated to the control group (N = 15) if they either worked under

one supervisor or two similar supervisors, in the same workplace on different days. Participants from neither group were informed of the precise aim of the study.

Ambulatory blood pressure among the members of each group was recorded every 30 minutes, over a 12-hour period for three days covering each of the following conditions: working with the favourably perceived supervisor, working with the less favourably perceived supervisor, and a non-work day. All participants began monitoring on a non-work day to establish baseline readings. Readings excluded from the analysis were those taken when travelling and before and after work. Activities at time of blood pressure reading were recorded in a 'quick response diary'. Participants were also asked to record significant events (both in work and non-work environments) and their mood states. Individual factors such as alcohol consumption and environmental variables were recorded and considered as exclusion criteria if anomalous.

Supervisory interactional style was measured. This was assessed by means of a 47 item, self administered, five point Likert-scale questionnaire. The items included statements such as: 'My supervisor encourages discussion before making a decision', and 'I am treated fairly by my supervisor'. Calculation of internal consistency produced a Cronbach's alpha of 0.9817, indicating internal consistency. The need for social approval was also measured, using the Revised Short-Form Martin-Larsen's⁴⁵ Approval Motivation Scale (MLAM) (with a Cronbach alpha of 0.8). Both of the used scales are validated and previously used in number of studies in health and wellbeing.

Outcomes

A t-test of supervisor interactional styles showed that the difference between the experimental group's less favoured supervisor's score and the control group was significant ($p < 0.017$). Standard deviations are not reported but the observed scores for the combined groups ranged widely from 63 to 234, resulting in a mean supervisor score of 172. The mean favoured supervisor scores for the experimental and control groups were almost equivalent; 200 and 193 respectively. The mean scores for the less favoured supervisors were significantly different from the experimental and control groups; 125 and 190 respectively.

Group analyses for the experimental group indicated that working under a less favourably perceived supervisor was associated with significant increases in blood pressure, compared with working under a favourably perceived supervisor or on a non-working day.

The increments in the experimental group's blood pressure associated with working under a less favourably perceived supervisor were found to be 12mmHg (systolic) ($p=0.001$) and 6mmHg (diastolic) ($p=0.038$) over and above the slight increments shown by the control group. Increases in blood pressure associated with the less favoured supervisor resulted in five of the 13 (38 per cent) experimental group members showing hypertension (isolated systolic ($N = 3$), isolated diastolic ($N = 1$), or a combination of both ($N = 1$)).

Experimental group participants only, showed a non-significant decrease in diastolic blood pressure when working under a favoured supervisor, compared with a non-work day. Although not statistically significant, the authors argue that it could be 'tentatively interpreted as indicating that working under a favoured supervisor has a beneficial impact on employees' wellbeing'.

Limitations

The study was rated (-) and has a very small sample size and there was a relatively high attrition rate (49 per cent) between the drawn sample ($N = 43$) and the observed sample ($N = 28$). The authors conducted comparative analyses to investigate whether the participants who withdrew from the study showed significant differences in supervisor scores, reported anxiety, depressive symptoms and 'need for social approval'. Only one significant difference was found – participants who withdrew from the study reported significantly higher 'need for social approval' than those who completed the study.

The authors argue that it is possible that the observed increment in employees' blood pressure when working under the less favourable supervisor was an underestimation of the true magnitude of the effect. Also, the decrease in the experimental participants' diastolic blood pressure when working under the favoured supervisors may also have been underrepresented. These underestimations may be because:

- The detrimental effect of the less positive supervisor is possibly ameliorated by the advantageous effect of working under a positive supervisor on alternate days.
- The beneficial effect of the positively perceived supervisors on participants' diastolic blood pressure may not have been fully observed because of the variation in the control group's supervisor ratings on the Likert scale. Although average supervisor scores were equivalent to those of the experimental group's 'positive' supervisor, the range of scores was much greater than those of the experimental group (63–234, compared to 191–234). Therefore the true effect of working under a positive supervisor may have been diluted in the analysis because some of the

control group participants were working under fairly negatively perceived supervisors. The review team also note that the maximum score was 235 so both groups contained very highly rated supervisors.

In addition the review team note that it is unclear how independent each of the participants were and, for example whether any were working in the same workplace and/or for the same supervisor. Some of the statistical data are unclear, for example whether the blood pressure measurements were treated as independent observations.

Applicability to the UK

This study appears to be directly applicable to the UK. It is set in an unspecified number of hospitals, nursing homes and residential homes in the UK. However concerns about the quality of the study, in particular its sample size, need to be taken into account before drawing any significant conclusions on the basis of this study.

Zohar and Luria (2003)

This (+) 'controlled before and after study' examines the effect of providing feedback to supervisors on their interactions concerning safety with their subordinates on workers' safety behaviour in three companies in Israel.

The three companies participating in the study were:

- Company A: oil refinery – involving 121 male line workers (average age 34) and 13 male supervisors, with an average age of 44
- Company B: modern food plant processing baked goods such as pasta – involving 248 line workers (68 per cent males, average age: 34) and 23 male supervisors (average age: 40)
- Company C: modern food plant specialising in processing milk products – involving 187 line workers (89 per cent male, average age: 30) and 13 male supervisors (average age: 38).

The intervention phase lasted three months, during which bi-weekly personal feedback was given to shop-floor supervisors (level 1 managers), and their immediate superiors (level 2 managers). Feedback consisted of cumulative frequencies of reported interactions concerning safety between supervisor and subordinates, out of all reported work related interactions during consecutive 1 week intervals. Each supervisor received individual feedback, level 2 managers were given comparative information about all the supervisors reporting to them.

Level 2 managers then informed each supervisor of their relative position on a bi-weekly basis, and communicated their approval/disapproval of this information. The level 2 managers were also instructed to apply a performance appraisal format to these meetings. Senior level 3 managers also received summarised information during scheduled management meetings throughout the intervention, highlighting co-variation of supervisory practices and workers' safety behaviour. Since the intervention was limited to three months, it was made clear from the outset that modified supervisory practice would afterwards be normative and require changes in supervisory role definitions.

Two months prior to the intervention, baseline rates of safety-oriented supervisory interaction and worker safety behaviour were established in each company. There was a four-month follow up period which the authors say was a sufficiently long period for modified supervisory practices to have become normative, reflective modified supervisory role definitions. Safety climate questionnaires were administered during work hours one month before and two months after the intervention in Company A.

Members of research team observed workers' safety behaviours using an inter-rated checklist twice weekly at random times during the day and collected data from workers on their safety interactions using a one-page factual-oriented questionnaire. Group safety climate was measured (in Company A only) using a 10-item questionnaire with the two subscales (supervisory action and expectation). Participation was voluntary with few workers (four per cent) refusing to participate.

Outcomes

In all the companies involved, supervisory safety-oriented interaction increased significantly, resulting in significant changes in workers' safety behaviour and safety climate scores.

In **Company A** there was a steady increase in frequency of safety-oriented supervisory interactions, rising in the refinery section from an average base rate of about 35 per cent to 50 per cent by the end of the intervention, and continuing to climb in following months reaching a plateau of about 70 per cent. Results in the distribution section reveal similar patterns, rising from a base rate of 25 per cent to 40 per cent, and plateauing in the follow up period to about 65 per cent. Unsafe behaviour rates declined from a base rate of about 20 per cent in the refinery and 30 per cent in the canning plant, to a plateau of near zero by the end of the intervention. Correlations between weekly rates of supervisory practice and unsafe worker behaviour were as follows: $r_s = -0.81$ for unsafe electrical work; $r_s = -0.57$ for unsafe movement; $r_s = -0.86$ for failing to use protective gear; and $r_s = -0.89$ for poor

housekeeping ($p < 0.01$ in all cases). Safety climate data pre and post intervention revealed significant differences: paired t-tests revealed Supervisory Action sub-scale $t = 3.59$ ($p < 0.01$) and Expectation subscale $t = 4.11$ ($p < 0.01$).

In **Company B** there was already a high base rate of supervisory safety interaction, averaging 54 per cent with a correspondingly low base rate of unsafe behaviours (averaging 16 per cent). There was a steady increase in supervisory interaction reaching a plateau averaging 68 per cent by the end of the intervention that had not changed by the end of the follow up period. Correlations showing relationships between supervisors and workers practices: $r_s = -0.81$ for unsafe machine handling, $r_s = -0.75$ for unsafe materials handling and $r_s = -0.79$ for poor housekeeping ($p < 0.01$ in all cases).

In **Company C**, base rate of supervisory interaction averaged at 15 per cent. Improvement continued steadily after the intervention reaching a plateau of nearly 50 per cent by the end of the follow up four month period. Rates of unsafe behaviour demonstrated a parallel change, decreasing to a plateau averaging around 30 per cent. Correlations between supervisory and work practices resulted in: $r_s = -0.91$ for unused ear plugs; $r_s = -0.78$ for poor housekeeping; and $r_s = -0.89$ for door jamming ($p < 0.01$ in all cases).

Limitations

This study was rated ('+'). The authors report that in Company A the high levels of risk might have influenced the outcomes of intervention, inducing top management to embrace responsibility for workers' safety behaviour as part of their supervisory activity.

Although a four-month follow up was included, reported results should be interpreted with caution since long-term maintenance may be influenced by a number of other factors unaccounted for in the model. The authors were concerned that the change in culture might be short-lived and that managers may revert to old ways after a period of non-reinforcement.

The study focussed on transactional forms of safety intervention, whereas transformational leadership was not studied.

The review team note that there is the potential for workers' reporting of supervisors' safety interactions to be subject to clustering if they discussed the results between themselves. The independence of the reporting was not discussed in the paper.

Applicability to the UK

This study appears to be not applicable to the UK. It is set in Israel and it is likely that the management culture as well as the health and safety system is very different to that in the UK, which has a relatively good safety record. In each company the workforce was predominantly male, whereas in the food processing industry in the UK the workforce is mainly female. The study reports that in each case the baseline level of supervisory interaction with workplace safety was low. In one case (Company B) the workforce was reported to mainly comprise migrants (from Russia) which may have presented significant language difficulties.

3.2 Evidence Tables

Logan and Ganster (2005)

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>Authors: Logan M S, Ganster D C</p> <p>Year: 2005</p> <p>Citation: An Experimental Evaluation of a Control Intervention to Alleviate Job-Related Stress, Journal of Management 2005 31: 90</p> <p>Aims of study: -To examine a control-enhancing stress intervention. -To assess the role that supervisory support can play in changing employees' perceptions of workplace control. -To assess the impact that changes in control perceptions would</p>	<p>Source population/s: Country where study was conducted: United States, Canada and Mexico</p> <p>Setting: Division of a trucking company</p> <p>Location: Three different regions across United States.</p> <p>Sample characteristics: Overall sample included 67 Project Managers (PMs) from three of the five geographic regions of the company (chosen for ease of intervention delivery). Three PMs dropped out of the final sample, resulting in 64 PMs, managing 78 accounts. Some 59 PMs were male and 5 were female; age averaged 36.8 years. Tenure in position averaged 27 months</p>	<p>Method of allocation: In each region, the PMs were assigned a control number. Half of PMs from each region were then chosen for the intervention group through the use of a random number table.</p> <p>Intervention/s description: Intervention group (N= 34) and non-intervention group (N = 30). Those who were randomly assigned to the intervention group received a 10-hour training session covering: - dealing with outside vendors and the terminal shops and given discretion to decide which to use to provide their maintenance needs. - control over night-time road service coverage: - training in how to audit their individual project profit and loss statements.</p>	<p>Outcomes: Measures collected from PM surveys at pre-test and post-test periods (17 weeks after intervention): Overall control; Supervisory support; Somatic complaints; Depression; Anxiety; Job satisfaction.</p> <p>Method of analysis: Hierarchical multiple regression. Control variables initially used included age, experience, and number of trucks assigned to each account (used as a variable of job demands).</p>	<p>Report results for all relevant outcomes: In summary, there were significant changes in control perceptions and job satisfaction, but only for managers who initially had supportive supervisors. The intervention had no main effects on either control or stress-related outcomes. "In interaction with social support, the intervention changed the more proximal job attitudes but not the more distal outcomes of anxiety, depression, or somatic complaints." Social support interacted with the intervention affecting overall control ($\Delta R^2 = .07$, $p < .01$) and thus moderated the effect of intervention on levels of perceived control. Found a significant interaction effect only for job satisfaction ($\Delta R^2 = .05$, $p < .01$). Intervention M=0.53 SD= 0.50</p> <p><i>Time 2</i> Anxiety M=1.79 SD=0.45 Somatic 1.42 0.57 Depression M= 1.49 SD=0.40 Satisfaction M= 5.43 SD= 0.81 Control M=3.39 SD=0.55 Supervisory support M=4.25 SD=0.74</p> <p><i>Time 1</i> Anxiety M=1.96, SD 0.40 Supervisory support M=4.25 SD=0.74 Somatic M=1.52 SD=0.49 Depression M=1.51 SD=0.42</p>	<p>Limitations identified by author: Possibility that that the intervention was "diffused" to members of the no-intervention group, although the authors deem this unlikely due to PMs geographical dispersion. Relatively small sample size. 17 weeks could have been an insufficient period for the intervention to have had effect on general wellbeing outcomes, although the authors think this time period was long enough. The scaling of the control measure shifted as a result of the intervention (beta change) and PMs wanted more opportunity for self-determination at work. Source of funding: Unclear</p>

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>have on stress-related outcomes.</p> <p>Study design: RCT</p> <p>Quality score (+)</p> <p>External Validity score: (+)</p>	<p>(raking from 2 to 72 months). The accounts PMs managed had an average of 14 drivers per account (between 5-85 drivers).</p> <p>Selected population:</p> <p>Inclusion criteria: Individuals who managed geographically dispersed profit centres.</p> <p>Excluded population/s: PMs leaving the company before the post-test survey (3 PMs)</p>	<p>The study was low powered due to relatively small sample size.</p> <p>Sample size calculation was not performed</p>		<p>Satisfaction M=5.57 SD=0.70 Control M=3.44 SD=0.47 Supervisory support M=4.22 SD=0.62 Number of trucks M=17.91 SD=20.77</p> <p>In follow-up telephone interviews at 7 weeks post intervention all PMs reported they remembered what they were taught during the training sessions and that, to varying degrees, they incorporated the new options into their work routines.</p>	

Nielsen et al. (2010)

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>Authors: Nielsen K, Randall R, Christensen KB. (A) AND Randall R, Nielsen K, Tvedt SD (B) AND Nielsen K and Randall R (C)</p> <p>Title and source: A) Does training managers enhance the effects of implementing team-working? A longitudinal, mixed methods field study. Human Relations 2010 63: 1719 DOI: 10.1177/0018726710365004 B) The development of five scales to measure employees' appraisals of organizational-level stress management interventions. Work & Stress. 2009: Vol. 23, No.1, 1-23. DOI: 10.1080/02678370902815277 C) Manager's active</p>	<p>Source population/s: Country of study Denmark Setting Two almost identical elderly care centres in a large Danish local government organisations Location Urban Sample characteristics Intervention group: T1: 177 (87% response rate) and Control: 277 (79%). T2: Intervention: 128 (65%) and Control: 152 (49%). The majority were female (93%) with average age of 44 (SD=11.2). Majority were healthcare assistants (62%) and nurses (12%), 8% had other type of healthcare education, and 18% had no health-related education. Before the implementation of teams, all study participants were organised in geographically-defined groups. Each of these groups had a formal, external leader with</p>	<p>Method of allocation: Centres were randomly allocated status as intervention or comparison (control) group. Intervention: Teams were formed by dividing existing groups of employees into smaller teams that became jointly responsible for a group of clients: team members were then jointly responsible for allocating tasks and for deciding how they should be dealt with. Regular team meetings were introduced. <i>The manager training</i> A theory-driven (action learning) and evidence-based team manager training course, developed by the research team and internal consultants was delivered to the managers within the intervention group. The training required managers to address real-life problems, so that managers would be</p>	<p>Outcomes: -Improvements in employees' perceptions of task design (increased team independence and autonomy) and team processes (increased motivation and improved social climate). -Managers training will be significantly related to the effectiveness of the team implementation - Employees' questionnaire: Input: interdependency, autonomy Process: Motivation, social climate, transformational leadership Output: Team effectiveness, Involvement, Job satisfaction Measurement points: The study took place</p>	<p>Some significant differences were found between the intervention and the comparison group. Involvement ($p < .10$) and job satisfaction ($p < .05$) decreased in the comparison group and increased or remained stable in the intervention group.. Similarly, effects were found for both team effectiveness and motivation: the comparison group saw a decrease whereas the intervention group remained stable. Interdependency increased in the comparison group and decreased in the intervention group. This difference was significant ($p < .05$). Both the comparison group and the intervention group experienced an increase in autonomy with the difference being slightly higher in the comparison group. Reported results for relevant outcomes: <u>Interdependency</u> Control: T1 76.4 (14.3) T2 78.9 (11.2) Change: 2.80 (CI 95% -0.10, 5.71) Intervention: T1 79.1 (12.5) T2 76.7 (11.6) Change: -2.43 (CI 95% -5.61, 0.75). Effect: .39 <u>Autonomy</u> Control: T1 60.7 (16.5) T2 64.8 (14.5) Change: 3.81 (CI 0.26, 7.36) Intervention: T1 60.2 (16.8) T2 63.4 (13.9) Change: 2.52 (CI 95% -1.45, 6.50). Effect: .08 <u>Motivation</u> Control: T1 65.3 (19.4) T2 60.0 (19.0)</p>	<p>Limitations identified by author: Problems in implementation: employees already functioned as teams before the intervention which could have resulted in non-significant findings. Changes in control group could have affected the findings; the employees' were responsible for a smaller number of clients and employees were given additional responsibilities. There were no such changes in responsibilities in intervention group. In both groups, changes at the governmental level made it more difficult to implement team working because they were not allowed to use temporary staff to cover absent colleagues.</p> <p>Limitations identified by review team: Randomisation process was not well-reported.</p>

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<p>support when implementing teams: the impact on employee wellbeing, Applied Psychology: Health and Wellbeing. 2009, 1 (3), 374-390. DOI: 10.1111/j.1758-0854.2009.01016.</p> <p>Country of authors: A) Denmark and UK B) UK, Denmark and Norway</p> <p>Study design: Longitudinal quasi-experimental intervention</p> <p>Quality score⁴ +</p> <p>External Validity score: +</p>	<p>managerial responsibilities, who participated in the training course (n=17). Group sizes varied from two to 35. The mean group size was 15 at Time 1 and 12 at Time 2. At Time 2, the very large groups had been divided into smaller teams to help develop interdependency. Thus one manager could have up to three teams. The intervention and comparison groups were not significantly different in terms of their demographics.</p> <p>Selected population: Inclusion criteria NR</p> <p>Excluded population/s: Five participants because they did not complete the questionnaires</p>	<p>encouraged to re-evaluate their attitudes and start thinking in new ways about their work practices. Managers were required to develop action plans to be implemented in their own teams to support the transfer of learning. The training course consisted of six days training spread over a period of six months.</p>	<p>over an 18 months period. The questionnaire data was collected before the intervention and at 18 months.</p> <p>Method of analysis: Qualitative and quantitative methods were used to evaluate training and changes in attitudes and behaviour. For the follow-up questionnaire, general regression analysis was used.</p>	<p>Change: -4.49 (CI -8.72, -0.26) Intervention: T1 70.3 (17.6) T2 70.8 (17.6) Change: 0.25 (CI -4.38, 4.88) Effect: .26</p> <p><u>Team effectiveness</u> Control: T1 53.8 (19.1) T2 51.0 (17.9) Change: -2.65 (CI 95% -6.76, 1.46) Intervention: T1 56.4 (17.0) T2 58.6 (19.5). Change: 0.71 (CI 95% -3.75, 5.16). Effect: .18</p> <p><u>Involvement</u> Control T1 55.3 (17.0) T2 53.5 (15.7). Change: -1.90 (CI 95% -5.34, 1.54) Intervention: T1 58.5 (16.3) T2 62.1 (14.2). Change: 3.26 (CI 95% -0.64, 7.15). Effect: .31</p> <p><u>Job satisfaction</u> Control: T1 67.6 (16.6) T2 62.7 (15.7). Change: -5.00 (CI 95% -8.49, -1.51) Intervention: T1 65.8 (15.1) T2 66.9 (15.1). Change 0.5 (CI 95% -3.42, 4.43). Effect: .35</p> <p>Separate analysis of the same data in a different paper (Nielson and Randall, 2009) indicates that at Time 2 employees' assessment of their working conditions significantly predicted employee wellbeing and job satisfaction which in turn was predicted by employees' ratings of their middle managers' active involvement in the intervention.</p>	<p>Intervention and control group teams were working at the same organisations therefore it is likely that managers in intervention group may have discussed about the training with their peers who were in the control group. This could have resulted in managers in control group changing their behaviour and could have biased the results.</p> <p>Number of lost participants in follow-up was 28% in intervention and 46% in control group. High number of lost participants in control group could have caused biased results because those who responded might have been motivated to participate in the study.</p> <p>Source of funding: The Danish Working Environment Research Fund</p>

Uegaki et al. (2011)

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>Authors: K. Uegaki, S. G. Stomp-van den Berg, M. C. de Bruijne, M. N. van Poppel, M. W. Heymans, W. van Mechelen and M. W. van Tulder</p> <p>Year: 2011</p> <p>Citation: Cost-utility analysis of a one-time supervisor telephone contact at 6-weeks post-partum to prevent extended sick leave following maternity leave in The Netherlands: results of an economic evaluation alongside a</p>	<p>Source population/s: Country of study Holland</p> <p>Setting 15 'companies' (9 health care; 5 service; 1 government)</p> <p>Location Urban & rural</p> <p>Sample characteristics 15 out of 93 companies approached agreed to take part. Within the companies the study involved 416 Supervisors and 541 pregnant women on maternity leave (recruited from a possible 1800-2500 working mothers invited to take part in the study)</p> <p>Authors report that they had difficulty recruiting companies which might be a source of bias. Working mothers recruited had a higher</p>	<p>Method of allocation: Randomisation took place at supervisor level. For each participating company, a randomisation list was generated. Block randomisation (blocks of 4 - 2 intervention and 2 control) was used. When participants were 35 weeks pregnant they were allocated to the next group in the block. Supervisors and participants in the control group and data entry assistants were blinded to group allocation.</p> <p>Intervention: Supervisor telephone contact (STC) with the employee while she was on maternity leave by instigating the involvement of occupational health services 6-12 weeks earlier than in the usual situation. At 6-weeks post-partum, supervisors contacted their employees to conduct a standardised interview in order to identify health problems that may be barriers to return to work after the official end of maternity leave. If such health problems were identified, the support of the occupational health services was offered. This telephone interview was in addition to the usual congratulatory telephone calls,</p>	<p>Outcomes: Resource use QALY Sick leave hours Work presenteeism hours (not defined) Total productivity loss hours Measurement points: Utility: 6 wks 12 wks 24 wks 52 wks Resource use: 6 wks 12 wks 24 wks 30 wks 36 wks 42 wks 48 wks 52 wks</p> <p>Method of analysis: Cost, effect and cost-utility utility</p>	<p>Report results for all relevant outcomes: Data available at end of study on 200 in the treatment group (75% of the starting sample) and 210 in the control group (76%).</p> <p>Results: At the end of the follow-up period, there were no statistically significant between-group differences in QALYs (baseline data are not reported) (STC mean = 0.928, S.D. = 0.094; CP mean = 0.935, S.D. = 0.087; mean difference = -0.007, 95% CI: -0.023; 0.009). Also, the groups did not differ in terms of mean number of sick leave hours (STC = 26.1, S.D. = 66.3; CP = 24.6, S.D. = 65.2; mean difference = 1.5, 95% CI: -10.1; 13.0), work presenteeism hours (STC = 24.1, S.D. = 36.7; CP = 20.7, S.D. = 29.8; mean difference = 3.4, 95% CI: -2.2; 9.1) or total productivity loss hours (STC = 50.2, S.D. = 84.2; CP = 45.3, S.D. = 77.6; mean difference = 4.9, 95% CI: -9.1; 18.9). Again baseline data are not</p>	<p>Limitations identified by author: Risk for selection bias: low proportion of approached companies agreed to take part and those that did may represent an optimal setting; sample of working mothers had higher than average levels of education</p> <p>Maternity leave regime in Netherlands is different from that in the UK (women are entitled to 16 weeks full-pay; in UK 52 weeks of maternity leave is possible).</p> <p>Limitations identified by review team: The intervention (a phone call from the supervisor) was of a low intensity, more frequent contact may have had a different result.</p> <p>Study population are likely to have better health than average and may have higher levels of motivation, minimising sick leave. The study reported that the sick leave rates of the study population were lower than</p>

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>randomized controlled trial. BMC Public Health 2011 11:57.</p> <p>Aim of study</p> <p>To economic evaluate a supervisory intervention with employees on maternity leave</p> <p>Study design:</p> <p>RCT</p> <p>Quality score ++</p> <p>External Validity score: +</p>	<p>socio-economic status than average.</p> <p>Selected population:</p> <p>Inclusion criteria</p> <p>Pregnant workers who had submitted maternity leave requests and who were:</p> <p>Aged 18-45</p> <p>Worked at least 12 hrs pw</p> <p>Had a clear intention of returning to work after maternity leave to same employer.</p> <p>Excluded population/s:</p> <p>Miscarriage or early delivery</p> <p>Full-work disability benefits requested o received</p> <p>Unclear intention to return to work</p>	<p>cards and visits. Supervisors received written and oral instruction about their role as case managers and a prompt to make the intervention.</p> <p>The control group did not receive the supervisor intervention, but in all other respects were treated the same as the intervention group</p> <p>265 women were allocated the treatment group (supervisors N = 208) and 276 to the control group (supervisors N = 210) at baseline and were similar in their key characteristics.</p> <p>Nine participants were lost in follow-up; 29 cases partially missing data in intervention group and 27 in control group.</p> <p>The study was powered at 80% (total of 550 pregnant women needed)</p>	<p>analysis.CI 95%)</p> <p>The data were analysed according to intention to treat principle. Sensitivity analyses were conducted to test robustness of the main findings.</p>	<p>reported for these measures.</p>	<p>those reported in the literature used to conceptualise the intervention. In the study, only two per cent of the women took sick leave at the end of their maternity leave versus 29 per cent. The authors stated that “this unexpected result suggests that there may not have been a problem upon which to intervene.” It is therefore unclear whether ill-health post-pregnancy is a significant cause of sick leave and negative wellbeing.</p> <p>Source of funding: The Body &Work Research Centre in Amsterdam</p>

Wager et al. (2003)

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>Authors: Wager N, Fieldman G, Hussey T Year: 2003</p> <p>Citation: The effect on ambulatory blood pressure of working under favourably and unfavourably perceived supervisors, <i>Occup Environ Med</i> 2003;60:468-474</p> <p>Country of study: UK</p> <p>Aim of study: To investigate the role played by employees' perceptions of their supervisors'</p>	<p>Source population/s: Country of study: UK Setting: Hospitals, nursing homes, and residential homes. Location (urban, rural): Not reported.</p> <p>Sample characteristics:</p> <p>Initial sample of 43 female healthcare assistants, but there was an attrition rate of 49%, resulting in 28 participants (13 in experimental group, 15 in control group). Women aged between 18-45 from hospitals, nursing homes and residential homes.</p> <p>Selected population: Participants were selected from a pool of suitable respondents answering a supervisor interactional style questionnaire, completed an average of three weeks before the physiological</p>	<p>Method of allocation: Single blind investigation (participants). The experimental group was chosen on the basis that they worked under two different supervisors, of equal status, on different days, in the same work environment, and of whom they held divergent perceptions. Participants were allocated to the control group if they either worked under one supervisor or two similar supervisors, in the same workplace on different days.</p> <p>Intervention/s description: The intervention was a change of supervisor from one who was positively rated to one who was negatively rated</p>	<p>Outcomes:</p> <p>The ambulatory blood pressure of participants was recorded every 30 minutes, over a 12-hour period for three days, in three conditions: working with the favourably perceived supervisor, working with the less favourably perceived supervisor, and a non-work day.</p> <p>All participants began monitoring on a non-work day to establish baseline readings. Readings taken when travelling and before and after work were excluded. Activities at time of blood pressure reading were recorded in a "quick response diary". Participants were also asked to record significant events and individual factors such as alcohol consumption and environmental variables were recorded.</p> <p>Supervisor interactional style: assessed through 47 item, self administered, five point Likert-scale.</p> <p>Means and standard deviations of ambulatory systolic and diastolic blood pressure were calculated.</p> <p>Need for social approval calculated using the revised short form Martin-Larsen's Approval</p>	<p>Report results for all relevant outcomes:</p> <p>The mean scores for the less favoured supervisors were significantly different from the experimental and control group (125 and 190 respectively) ($p < 0.017$).</p> <p>The means for favoured supervisor scores were 200 and 193 for the experimental and control group respectively.</p> <p>The results provide support for the proposition that supervisor interactional style is a potential workplace stressor and a possible contributory risk factor for the development of coronary heart disease, particularly for employees in the lower strata of the organisational hierarchy.</p> <p>The experimental group showed significantly higher systolic (mean difference = 15mm Hg, SD = 11.9, 95% CI = 6.5 to 22.9, $t = -3.894$, $p = 0.001$) and diastolic (mean difference = 7mmHg, SD = 5.4, 95% CI = 1.5 to 12, $t = -2.781$, $p =$</p>	<p>Limitations identified by author:</p> <p>Possible that the observed increment in employees' blood pressure when working under the less favourable supervisor was an underestimation of the true magnitude of the effect. Also, the decrease in the experimental participants' diastolic blood pressure when working under the favoured supervisors may also have been underrepresented. These underestimations may be because:</p> <ul style="list-style-type: none"> - The detrimental effect of the less positive supervisor is possibly ameliorated by the advantageous effect of working under a positive supervisor on alternate days. - The beneficial effect of the positively perceived supervisors on participants' diastolic blood pressure may not have been fully observed because of the variation in the control group's supervisor scores. Although average supervisor scores were equivalent to those of the experimental group's "positive" supervisor, the range of scores was much greater than those of the experimental group (63-234, compared to 191-234). Therefore the true effect of working under a

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<p>interactional styles as a possible source of workplace stress that may be associated with increased morbidity and mortality rates from cardiovascular disorders in workers in the lower strata or organisational hierarchies.</p> <p>Study design: Non-randomised Control Trial</p> <p>Quality score: (-)</p> <p>External Validity score: (-)</p>	<p>monitoring trial. Healthcare assistants were chosen for the study due to their low hierarchical status; high levels of reported work stress; and poor health; and to use an occupational group routinely working under a number of different supervisors in the same workplace.</p> <p>Inclusion criteria: A minimum of 27 score points difference between the two supervisor descriptions. This is the equivalent to a difference of one standard deviation of a validation study of the Supervisor Interactional Style Questionnaire.</p> <p>Excluded population/s:</p>	<p>Treatment group = (N=13) Control group= (N=15)</p>	<p>Motivation Scale (MLAM),.</p> <p>Method of analysis: The mean and standard deviations were calculated for the difference in blood pressure between the supervisor conditions for each group. Related t tests were computed for each of the two groups separately, to determine the significance levels of the observed differences in blood pressures in the two supervisor conditions. A one way, unrelated ANOVA was performed to determine whether the observed increases in blood pressures in the less favoured supervisor condition of the experimental group were significantly higher than those of the control group on their workday with the highest average blood pressure recordings. To determine the effect size of the observed differences in blood pressure between the two groups, the h2 statistic was computed using the harmonic mean sample size.</p> <p>For supervisor interactional style a t-test was conducted to test the significance of the difference between the observed differences between control and experimental group.</p>	<p>0.008) blood pressure when working under a less favoured supervisor compared to a favoured supervisor. No significant difference was observed in the control group's diastolic blood pressure (mean difference = 1 mm Hg, SD = 1.8, 95% CI = -1.1 to 3.1, t = 1.01, p = 0.33, NS). However, their average systolic pressure was higher on one of the workdays (mean difference = 3 mm Hg, SD = 3.2, 95% CI = 1.88 to 4.3, t = -4.53, p = 0.001).</p> <p>The degree of difference in supervisor scores has a significant positive relation with the magnitude of difference in both systolic (b = 0.580, SE = 8.35; F = 13.212; df = 1,17; p = 0.001) and diastolic blood pressure (b = 0.660, SE = 3.43; F = 20.120; df = 1,17; p = 0.0005). The strongest associations with both blood pressure measures were with items linked to interpersonal fairness (SBP: r = 0.724, p = 0.0001; DBP: r = 0.784, p = 0.0001).</p>	<p>positive supervisor may have been diluted in the analysis because some of the control group participants were working under fairly negatively perceived supervisors.</p> <p>The scale does not assess overt bullying behaviours. Items pertaining to this dimension were removed during the pilot/validation study.</p> <p>Limitations identified by the review team: The sample size is very small and the attrition rate, at 49 per cent, was high. It is also worth noting that the maximum score was 235 so both groups contained very highly rated supervisors. In addition it is unclear how independent each of the participants were and, for example whether any were working in the same workplace and/or for the same supervisor. In some of the statistical data are unclear, for example whether the blood pressure measurements were treated as independent observations.</p> <p>Source of funding: Unclear.</p>

Zohar and Luria (2003)

Study details	Population and setting	Method of allocation to Intervention/control	Outcomes and methods of analysis	Results	Notes by review team
<p>Authors: D.Zohar, G. Luria</p> <p>Year: 2003</p> <p>Citation: Zohar, D. and Luria, G. (2003). The use of supervisory practices as leverage to improve safety behaviour: A cross-level intervention model. <i>Journal of Safety Research</i>, 34, 567-577.</p> <p>Aim of study: Aim of the present work was to extend the empirical base of supervisory-</p>	<p>Source population/s:</p> <p>Country of study : Israel</p> <p>Setting: Company A: oil refinery, Company B: modern food plant processing baked goods, Company C: modern food plant specialising in processing milk products.</p> <p>Sample characteristics: Company A: 121 line workers and 13 shop floor supervisors. The workforce was all male, average age of 33.9 (SD = 6.2), average plant tenure was 6.1 years (SD = 5.8). All male supervisory personnel were older (average age = 44.2, SD = 5.1) and with longer tenure (average tenure = 10.4, SD = 5.2).</p> <p>Company B: 248 line workers and 23 shop-floor supervisors. Most of the workforce was male (68%), average age 33.5 (SD = 7.4) and average plant tenure</p>	<p>Method of allocation: NA</p> <p>Intervention/s description Intervention phase lasted 3 months, during which bi-weekly personal feedback was given to shop-floor supervisors (level 1 managers), and their immediate superiors (level 2 managers), concerning safety interactions between supervisor and subordinates. Each supervisor received individual feedback. Level 2 managers were given comparative information about all the supervisors reporting and fed that back to them. Senior level 3 managers received summarised information. The intervention was limited to 3 months..</p> <p>2 months prior to the intervention, baseline rates of safety-oriented supervisory interaction and worker safety behaviour were established in each company. There was a 4 month follow up period. In company A, safety climate questionnaires were</p>	<p>Outcome measures: <i>Safety-related supervisory interactions</i> were measured with the following ESM items: a sentence description of work related activities over the last two hours, a yes/no question if there had been verbal/nonverbal interaction with the supervisor during the previous two hours, if yes, the main subjects of interaction had to be marked on a short, empirically derived checklist, and if verbal the respondent was asked to provide a single sentence quotation. Last item was used to test internal reliability of ESM forms - majority were 92% internally consistent.</p> <p><i>Workers' safety behaviours</i> were measured by trained observers on the research team, using a quasi-random schedule of the day and time of arrival. Observers used a checklist of behaviours. Inter-judge reliability revealed considerable agreement ($r = 0.89, p < 0.01$).</p> <p><i>Group Safety Climate</i> was measured with a 10-item</p>	<p>Report results for all relevant outcomes:</p> <p>Company A - steady increase in safety-oriented supervisory interactions, rising in the refinery section from base rate of 35% to 50% by the end of the intervention, and continuing to climb to plateau about 70%. Results in the distribution section reveal similar patterns, rising from a base rate of 25% to 40%, and plateauing about 65%. Unsafe behaviour rates declined from a base rate of about 20% in refinery and 30% in canning, to a plateau of near zero by the end. Correlations between weekly rates of supervisory practice and unsafe worker behaviour were: $r_s = -0.81$ for unsafe electrical work, $r_s = -0.57$ for unsafe movement, $r_s = -0.86$ for failing to use protective gear and $r = -0.89$ for poor housekeeping ($p < 0.01$ in all cases). Safety climate data pre and post intervention revealed significant differences: paired t-tests revealed Supervisory Action sub-scale $t = 3.59$ ($p < 0.01$) and Expectation subscale $t = 4.11$ ($p < 0.01$).</p> <p>Company B: There was already a high base rate of supervisory</p>	<p>Limitations identified by author:</p> <p>In company A - high levels of risk might have influenced the outcomes of intervention, inducing top management to embrace responsibility for workers' safety behaviour as part of their supervisory activity.</p> <p>Although a 4 month follow up was included, reported results should be interpreted with caution since long-term maintenance may be influenced by a number of other factors unaccounted for in the model. In particular given the seemingly non-productive nature of investment and the biased reinforcement against management managers may revert to old ways after a period of non-reinforcement.</p> <p>Long-term evaluation still needed, and other factors that are likely to influence the maintenance of change</p>

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<p>level intervention by testing effect sizes in three different companies, and to incorporate additional ideas and methodological refinements.</p> <p>Study design: Longitudinal, before and after</p> <p>Quality score⁴, +</p> <p>External Validity score: +</p>	<p>4.8 years (5.1). The supervisory personnel were older (average = 40.2, SD = 6.3) and all male. The plant employed a large number of immigrants (mostly from Russia), some of whom only had limited command language skills.</p> <p>Company C: 187 line workers and 13 shop floor supervisors. Workforce mainly male (89%), average 29.5 (SD = 8.1) and average plant tenure 5.6 years (SD = 6.6). The all male supervisory personnel were older (average age = 37.5, SD = 7.2) and better educated, Participation was voluntary.</p> <p>Excluded population/s: Not reported</p>	<p>administered.</p> <p>Members of research team observed workers' safety behaviours twice weekly at random times during the day and collected data from workers on their safety interactions using a one-page factual-oriented questionnaire. Participation was voluntary with few workers (4 per cent) refusing to participate.</p> <p>Study power: Not reported</p>	<p>questionnaire with the two subscales (supervisory action and expectation). Alpha reliability for pre-intervention administration was 0.74 for Action and 0.79 for the Expectation sub-scale. Post-intervention alpha reliability was 0.77 for Action and 0.79 for Expectation.</p> <p>Follow-up periods: Baseline measure 2 months prior to intervention, intervention lasted 3 months and 4 months follow up period</p> <p>Method of analysis: Frequency percentages of supervisory rates and correlation analyses between rates of supervisory practice and unsafe worker behaviour.</p>	<p>safety interaction, averaging 54% with a correspondingly low base rate of unsafe behaviours (averaging 16%). There was a steady increase in supervisory interaction reaching a plateau averaging 68% by the end of the intervention that had not changed by the end of the follow up period. Correlations showing relationships between supervisors and workers practices: $r_s = -0.81$ for unsafe machine handling, $r_s = -0.75$ for unsafe materials handling and $r_s = -0.79$ for poor housekeeping ($p < 0.01$ in all cases).</p> <p>Company C: Base rate of supervisory interaction averaged at 15%. Improvement continued steadily after intervention reaching a plateau of nearly 50% by the end of the follow up period. Rates of unsafe behaviour decreased to a plateau averaging around 30%. Correlations between supervisory and work practices resulted in: $r_s = -0.91$ (unused ear plugs, $r_s = -0.78$ (poor housekeeping and $r_s = -0.89$ for door jamming ($p < 0.01$ in all cases).</p>	<p>before firm conclusions are drawn.</p> <p>Intervention designed to create supervisory level changes, but it is ultimately senior management's responsibility to maintain these changes.</p> <p>Results focussed on transactional forms of safety intervention, whereas transformational leadership was not studied.</p> <p>Limitations identified by review team:</p> <p>The review team note that there is the potential for workers' reporting of supervisors' safety interactions to be subject to clustering if they discussed the results between themselves. The independence of the reporting was not discussed in the paper.</p> <p>Source of funding: Prevention Research Unit, Ministry of Labour and Welfare, Jerusalem</p>

4 Discussion

This review includes evidence from five studies about the way in which supervisors can affect the wellbeing of the people they manage. While four of the five studies generally indicate that a positive relationship between supervisor and supervisee enhanced the latter's wellbeing, the studies tend to focus on either one particular aspect of the supervisor/supervisee relationship, a particular aspect of employee wellbeing or a particular group of workers and are of limited applicability to the UK. Therefore it is difficult to draw any general conclusions on the basis of this evidence alone.

The paucity of papers may reflect the nature of the research question for this review, which focussed on supervisory-level rather than organisational-level interventions. The lack of papers may also reflect the fact that management-level interventions are rarely evaluated sufficiently rigorously to pass the inclusion criteria that we have applied to this evidence review. We expect more comprehensive and illuminating evidence to be generated by the next two reviews which are likely to include a wider range of papers. The review for Research Question 2 covers organisational level interventions, while the review for Research Question 3 will include qualitative studies which are ineligible for the first two reviews.

4.1 Supportive supervision and job satisfaction

One study (Logan and Ganster 2005) found that a supportive supervisor could positively affect the job satisfaction of employees who were given more control over aspects of their jobs. However the study did not find any positive effect on other wellbeing measures (such as depression and anxiety). Nielsen et al. (2010) found that employees working for managers who had been trained in implementing an organisational change (on this occasion it concerned the introduction of team working) had higher levels of job satisfaction after the change had been introduced than those with managers who had not received the training. More evidence on the effect of training managers and interventions at an organisational level on the wellbeing of employees will be covered by the review of the evidence for Research

Question 2. Additional studies may also provide evidence of other aspects of employee wellbeing in addition to job satisfaction.

There is moderate evidence from two studies^{1 2} that the impact of organisational changes on employees' job satisfaction can be enhanced by positive supervisory intervention.

One (+) controlled quasi-experimental study¹ that when making an organisational change such as the introduction of team-working in a Danish care home, the job satisfaction of employees can be enhanced by the suitable training of managers to help them understand the change and how best to implement it (Effect .34 $p < 0.5$).

One North American (+) RCT study² found that positive supervisory support can act as a catalyst in changing employees' perceptions of an organisational change and enhance job satisfaction ($\Delta R^2 = .05$, $p < .01$), but does not have a positive effect on stress-related outcomes such as anxiety and depression.

The evidence is only partially applicable to the UK because of the different settings and the outcomes relate to job satisfaction rather than more central wellbeing measures.

¹ Nielsen et al. 2010 (+)

² Logan and Ganster, 2003 (+)

4.2 The detrimental effects of negatively perceived supervision

Another study (Wager et al. 2003) found that negatively perceived supervisory style had a detrimental affect on the wellbeing of the people they managed (as measured by blood pressure) and could therefore be seen as a workplace stressor. In this study the change between being supervised by a negatively perceived supervisor and a positively perceived supervisor could be seen as an intervention. In the review of Research Question 3 we will examine both what other factors associated with supervisors can positively or negatively affect the wellbeing of the people they manage and, if any studies fit our criteria, what determines whether supervisors are positively or negatively perceived and/or felt to be supportive.

There is weak evidence from a UK (-) controlled quasi-experimental study¹ based on a small sample that female healthcare assistants working in UK hospitals, care homes and residential homes under a less favourably perceived supervisor experienced significant increases in blood pressure (12mmHg (systolic) ($p=0.001$) and 6mmHg (diastolic) ($p=0.038$)), compared with when they worked under a favourably perceived supervisor or on a non-working day .

While this study appears to be directly applicable to the UK, being set in an unspecified number of UK hospitals, nursing and residential homes, there are concerns about its quality which need to be taken into account.

¹Wager et al. 2003 (-)

4.3 More supervisory interaction can have a positive impact on workplace safety

The fourth study (Zohar and Luria 2003) focused on safe working as a measure of wellbeing. It examined safety behaviour in three production workplaces in Israel and found that greater levels of interaction between supervisors and supervisees about safety issues resulted in higher levels of safe working and an enhanced safety climate. Regular feedback to supervisors from both the research team and senior managers appeared to be the catalyst to bringing about the change in supervisory practice and ultimately employee behaviour.

There is moderate evidence from a (+)'before and after' longitudinal study¹ set in Israel that providing feedback to supervisors on their interactions concerning safety with their subordinates on workers' safety behaviour in three production plants can result in significant positive changes in workers' safety behaviour and safety climate scores.

This evidence does not appear to be applicable to the UK because it is set in Israel where health and safety systems and cultures are different from that in the UK and the workforce is predominantly male and in one case mainly non-native speaking migrants.

¹Zohar and Luria 2003 (+)

4.4 Impact may depend on the intensity of the intervention

The last study (Uegaki et al. 2011), which examined the impact of a low level intervention between supervisors and the women who they managed and who were on maternity leave, found no positive impact on the women's wellbeing as measured by sickness absence on return from maternity leave. This may have been a result of the lack of intensity of the intervention (one phone call six weeks after the birth), the outcomes measures used and/or the nature of the people in the study (ie women on maternity leave).

There is moderate evidence from a (+) cost-utility analysis set in the Netherlands¹ that a low intensity intervention by supervisors in the form of an additional telephone contact had no effect on the wellbeing of 500 employees on maternity leave from a mix of companies.

This evidence appears to be not applicable to the UK. The maternity leave regime in the UK is significantly different to that in the Netherlands and the intervention would not be appropriate

¹ Uegaki et al. 2011 (+)

4.5 Role of senior management

Finally, two of the studies also provide some, fairly weak, evidence that middle managers can play a role in bolstering supervisory interventions and thereby enhancing employee wellbeing. In the Zohar and Luria (2003) study, senior (level 2 and level 3) managers were informed about the level of supervisory interaction with their employees and encouraged to reinforce the importance of the intervention through appraisals etc. This was reported by the authors to have contributed to the positive effects. Also in an additional paper based on the same data (Nielsen et al. 2010), Nielsen and Randall (2009) found that employees' assessment of their working conditions, which was found to be the key predictor of employee wellbeing and job satisfaction, was in turn related to employees' ratings of their middle managers' active involvement in the intervention.

There is weak evidence from two studies^{1 2} that show that support for interventions at supervisory level by middle managers can have a positive effect on employee wellbeing. In each study middle management support was seen as a contributory factor, although detailed results of the impact are not reported.

The evidence is only partially applicable to the UK because of the different settings and the lack of complete data.

¹ Zohar and Luria 2003 (+)

² Nielsen et al. 2010 (+)

Appendix 1: Sample search strategies

MEDLINE

1996 to present - OVID SP - 19 October 2013

Set number	Search term	Number of hits
1	exp Workplace/	11927
2	workplace.ti,ab	15016
3	worksite.mp.	1238
4	("work place*" or "work site*" or " work location*" or "work setting*").ti,ab	2485
5	((job* or employment) adj2 (place* or site* or setting* or location*)).ti,ab	592
6	(office* or factory or factories or shop* or business*).ti,ab	56948
7	(company or companies).ti,ab	25150
8	(worker* or employee* or staff*). ti,ab	141756
9	exp Employment/	33888
10	exp Work/	6463
11	employer*. ti,ab	8290
12	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11	245392
13	("line manager*" or manager* or supervisor*). ti,ab	25025
14	"Quality of Life"/ or "quality of life". ti,ab	145082
15	health/ or men's health/ or mental health/ or occupational health/ or women's health/	55742
16	exp Job Satisfaction/	12574

17	(wellbeing or wellbeing or "well being" or wellness). ti,ab	34165
18	happiness/	1937
19	((mental or physical or general) adj1 health). ti,ab	65109
20	((employee* or staff) adj2 health). ti,ab	3444
21	((work or job) adj1 (contentment or happiness or fulfilment or engagement or satisfaction)). ti,ab	3776
22	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	279301
23	12 and 13 and 22	2827
24	limit 23 to (english language and yr="2000 -Current")	1998

Note: / means MESH term.

Note: ti, ab = title, abstract

ABI-Inform - from Proquest

SU.EXACT("Supervisors") OR SU.EXACT("Line managers") OR SU.EXACT("Middle management")

AND

SU.EXACT("Work environment") OR SU.EXACT("Occupational safety") OR SU.EXACT("Occupational health") OR SU.EXACT("Occupational accidents") OR SU.EXACT("Occupational diseases") OR

SU.EXACT("Occupational psychology")

Limits:

English,

2000-2013

Source type

Books, Conference Papers & Proceedings, Reports, Scholarly Journals, Working Papers

102 hits

Repeated in **Proquest Digital Dissertations**, without the narrowing by source type : 62 hits.

Web of Science

presented in reverse order

#5 AND #1

Refined by: Languages=(ENGLISH) AND [excluding]
 Web of Science Categories=(COMPUTER SCIENCE
 THEORY METHODS OR HOSPITALITY LEISURE SPORT
 TOURISM OR INFECTIOUS DISEASES OR CARDIAC
 CARDIOVASCULAR SYSTEMS OR ENGINEERING
 MECHANICAL OR TOXICOLOGY OR IMMUNOLOGY OR
 MEDICAL INFORMATICS OR ONCOLOGY OR
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 MATERIALS SCIENCE MULTIDISCIPLINARY OR OPTICS
 OR ORTHOPEDICS OR CLINICAL NEUROLOGY OR
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 LANGUAGE PATHOLOGY OR BIOLOGY OR PEDIATRICS
 OR PHARMACOLOGY PHARMACY OR COMPUTER
 SCIENCE CYBERNETICS OR COMPUTER SCIENCE
 SOFTWARE ENGINEERING OR FAMILY STUDIES OR
 COMPUTER SCIENCE INTERDISCIPLINARY
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 GENETICS HEREDITY OR CRIMINOLOGY PENOLOGY OR
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 OR MEDICAL ETHICS OR MICROBIOLOGY OR
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 PAKISTAN OR AFGHANISTAN OR PHILIPPINES OR
 BOTSWANA OR ARGENTINA OR BRUNEI OR
 CAMEROON OR BANGLADESH OR CONGO OR SAUDI
 ARABIA OR GAMBIA OR UGANDA OR GUYANA OR
 ETHIOPIA OR KUWAIT OR TAIWAN OR MOZAMBIQUE
 OR LEBANON OR BRAZIL OR NIGERIA OR
 MADAGASCAR OR NAMIBIA OR THAILAND OR NETH

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#10

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MULTIDISCIPLINARY OR HISTORY OR DENTISTRY ORAL
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CARDIOVASCULAR SYSTEMS OR ENGINEERING
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#2	Topic=(health OR happiness OR contentment) <i>DocType=All document types; Language=All languages;</i>
#1	TS=("line manager*" OR "middle manage*" OR supervisor* OR foreman OR foremen) <i>DocType=All document types; Language=All languages;</i>

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Appendix 2: Inclusion and quality checklists

Inclusion/exclusion checklist

Population

Does the study population include:

adults over age 16?

in full or part-time employment, paid or unpaid?

who work for an organisation with at least one employee?

Yes	No

No > exclude

No > exclude

No > exclude

Setting

Is the study exclusively set in:

OECD countries?

the workplace?

Yes	No

No > exclude

No > exclude

Relevance

Does the study examine:

the influence of line managers' actions on the health and wellbeing of the people they manage?

Yes	No

the influence of organisational culture and/or workplace practices on how line managers influence the health and wellbeing of their employees?

No to both > exclude

Does the study focus on:

specific interventions to promote physical activity, mental wellbeing and smoking cessation in the workplace, and to manage sickness absence and the return to work of those who have been on long-term sick leave?

Yes	No

Yes > exclude

intervention or support that employees accesses on their own, without input from the employer, organisation or line manager?

Yes > exclude

statutory provision to employees?

Yes > exclude

Intervention

Does the study examine:

a) one or more specific interventions conducted by line managers with the people they manage?

Yes	No

tag as Review Question 1

b) one or more specific interventions conducted by the employing organisation with line managers

tag as Review Question 2

c) workplace or organisational factors which can influence the ability of line managers to enhance the health and wellbeing of the people they manage?

tag as Review Question 3

IF No to a-c = exclude

Study information

Is the study design:

	RQ1	RQ2	RQ3	
Review Yes > Q1, Q2, Q3				
Experimental Yes > Q1, Q2				All Q1 and Q2 studies may also be relevant to Q3
Longitudinal Yes > Q1, Q2				All Q1 and Q2 studies may also be relevant to Q3
Observational Yes > Q1, Q2				All Q1 and Q2 studies may also be relevant to Q3
Economic Yes > Q1, Q2				All Q1 and Q2 studies may also be relevant to Q3
Qualitative Yes > Q3				
Does the study provide good practice guidance? Yes > Q3				

IF Q1, Q2

Outcomes

	Yes	No	
Does the study assess the impact of the intervention (policy or workplace practice) on employee health and wellbeing?			No > exclude
Does the study include an explicit measure(s) of employee health and wellbeing outcomes?			No > exclude

Quality

	Yes	No
Does the study include some form of		

comparison between a treatment and a non-treatment group?

Does the study include at least two measurement points (ie at baseline and subsequently)?

No to both > exclude

Other information

Is the study a book?

Yes	No

Is the study set in:

USA?

UK?

Europe?

Other OECD?

No particular location?

Yes	No

Quality Appraisal Checklist

Study identification: (Include full citation details)	
Reference number:	
Study design: Refer to the glossary of study designs (appendix D) and the algorithm for classifying experimental and observational study designs (appendix E) to best describe the paper's underpinning study design	
Guidance topic:	
Assessed by:	
Section 1: Population	
1.1 Is the source population or source area well described? Was the country (eg developed or non-developed, type of healthcare system), setting (primary schools, community centres etc.), location (urban, rural), population demographics etc. adequately described?	++ + - NR NA
1.2 Is the eligible population or area representative of the source population or area? Was the recruitment of individuals, clusters or areas well defined (eg advertisement, birth register)? Was the eligible population representative of the source? Were important groups under-represented?	++ + - NR NA

<p>1.3 Do the selected participants or areas represent the eligible population or area?</p> <p>Was the method of selection of participants from the eligible population well described?</p> <p>What % of selected individuals or clusters agreed to participate? Were there any sources of bias?</p> <p>Were the inclusion or exclusion criteria explicit and appropriate?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>Section 2: Method of allocation to intervention (or comparison)</p>		
<p>2.1 Allocation to intervention (or comparison). How was selection bias minimised?</p> <p>Was allocation to exposure and comparison randomised? Was it truly random ++ or pseudo-randomised + (eg consecutive admissions)?</p> <p>If not randomised, was significant confounding likely (-) or not (+)?</p> <p>If a cross-over, was order of intervention randomised?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>2.2 Were interventions (and comparisons) well described and appropriate?</p> <p>Were interventions and comparisons described in sufficient detail (ie enough for study to be replicated)?</p> <p>Was comparisons appropriate (eg usual practice rather than no intervention)?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>2.3 Was the allocation concealed?</p> <p>Could the person(s) determining allocation of participants or clusters to intervention or comparison groups have influenced the allocation?</p> <p>Adequate allocation concealment (++) would include centralised allocation or computerised allocation systems.</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>

<p>2.4 Were participants or investigators blind to exposure and comparison?</p> <p>Were participants and investigators – those delivering or assessing the intervention kept blind to intervention allocation? (Triple or double blinding score ++)</p> <p>If lack of blinding is likely to cause important bias, score –.</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p> <p>NA</p>	<p>Comments:</p>
<p>2.5 Was the exposure to the intervention and comparison adequate?</p> <p>Is reduced exposure to intervention or control related to the intervention (eg adverse effects leading to reduced compliance) or fidelity of implementation (eg reduced adherence to protocol)?</p> <p>Was lack of exposure sufficient to cause important bias?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>2.6 Was contamination acceptably low?</p> <p>Did any in the comparison group receive the intervention or vice versa?</p> <p>If so, was it sufficient to cause important bias?</p> <p>If a cross-over trial, was there a sufficient wash-out period between interventions?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>2.7 Were other interventions similar in both groups?</p> <p>Did either group receive additional interventions or have services provided in a different manner?</p> <p>Were the groups treated equally by researchers or other professionals?</p> <p>Was this sufficient to cause important bias?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	<p>Comments:</p>
<p>2.8 Were all participants accounted for at study conclusion?</p>	<p>++</p>	<p>Comments:</p>

<p>Were those lost-to-follow-up (ie dropped or lost pre-,during or post-intervention) acceptably low (ie typically <20%)?</p> <p>Did the proportion dropped differ by group? For example, were drop-outs related to the adverse effects of the intervention?</p>	<p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	
<p>2.9 Did the setting reflect usual UK practice?</p> <p>Did the setting in which the intervention or comparison was delivered differ significantly from usual practice in the UK? For example, did participants receive intervention (or comparison) condition in a hospital rather than a community-based setting?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	Comments:
<p>2.10 Did the intervention or control comparison reflect usual UK practice?</p> <p>Did the intervention or comparison differ significantly from usual practice in the UK? For example, did participants receive intervention (or comparison) delivered by specialists rather than GPs? Were participants monitored more closely?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	Comments:
<p>Section 3: Outcomes</p>		
<p>3.1 Were outcome measures reliable?</p> <p>Were outcome measures subjective or objective (eg biochemically validated nicotine levels ++ vs self-reported smoking -)?</p> <p>How reliable were outcome measures (eg inter- or intra-rater reliability scores)?</p> <p>Was there any indication that measures had been validated (eg validated against a gold standard measure or assessed for content validity)?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	Comments:
<p>3.2 Were all outcome measurements complete?</p> <p>Were all or most study participants who met the defined study outcome definitions likely to</p>	<p>++</p> <p>+</p>	Comments:

<p>have been identified?</p>	<p>- NR NA</p>	
<p>3.3 Were all important outcomes assessed? Were all important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?</p>	<p>++ + - NR NA</p>	<p>Comments:</p>
<p>3.4 Were outcomes relevant? Where surrogate outcome measures were used, did they measure what they set out to measure? (eg a study to assess impact on physical activity assesses gym membership – a potentially objective outcome measure – but is it a reliable predictor of physical activity?)</p>	<p>++ ++ + - NR NA</p>	<p>Comments:</p>
<p>3.5 Were there similar follow-up times in exposure and comparison groups? If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up (eg using person-years).</p>	<p>++ + - NR NA</p>	<p>Comments:</p>
<p>3.6 Was follow-up time meaningful? Was follow-up long enough to assess long-term benefits or harms? Was it too long, eg participants lost to follow-up?</p>	<p>++ + -</p>	<p>Comments:</p>

	NR NA	
Section 4: Analyses		
<p>4.1 Were exposure and comparison groups similar at baseline? If not, were these adjusted?</p> <p>Were there any differences between groups in important confounders at baseline? If so, were these adjusted for in the analyses (eg multivariate analyses or stratification). Were there likely to be any residual differences of relevance?</p>	++ + - NR NA	Comments:
<p>4.2 Was intention to treat (ITT) analysis conducted?</p> <p>Were all participants (including those that dropped out or did not fully complete the intervention course) analysed in the groups (ie intervention or comparison) to which they were originally allocated?</p>	++ + - NR NA	Comments:
<p>4.3 Was the study sufficiently powered to detect an intervention effect (if one exists)?</p> <p>A power of 0.8 (that is, it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?</p>	++ + - NR NA	Comments:
<p>4.4 Were the estimates of effect size given or calculable?</p> <p>Were effect estimates (eg relative risks, absolute risks) given or possible to calculate?</p>	++ + - NR	Comments:

	NA	
<p>4.5 Were the analytical methods appropriate?</p> <p>Were important differences in follow-up time and likely confounders adjusted for?</p> <p>If a cluster design, were analyses of sample size (and power), and effect size performed on clusters (and not individuals)?</p> <p>Were subgroup analyses pre-specified?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	Comments:
<p>4.6 Was the precision of intervention effects given or calculable? Were they meaningful?</p> <p>Were confidence intervals or p values for effect estimates given or possible to calculate?</p> <p>Were CI's wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?</p>	<p>++</p> <p>+</p> <p>-</p> <p>NR</p> <p>NA</p>	Comments:
Section 5: Summary		
<p>5.1 Are the study results internally valid (ie unbiased)?</p> <p>How well did the study minimise sources of bias (ie adjusting for potential confounders)?</p> <p>Were there significant flaws in the study design?</p>	<p>++</p> <p>+</p> <p>-</p>	Comments:
<p>5.2 Are the findings generalisable to the source population (ie externally valid)?</p> <p>Are there sufficient details given about the study to determine if the findings are generalisable to the source population? Consider: participants, interventions and comparisons, outcomes, resource and policy implications.</p>	<p>++</p> <p>+</p> <p>-</p>	Comments:

Appendix 3: Bibliography of included studies

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Appendix 4: Bibliography of excluded studies with reasons for exclusion

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