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SHARED INTELLIGENCE

Workplace Physical Activity in Wales




LITERATURE REVIEW

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Contents

1. Introduction

175 million working days are lost each year in the UK due to sickness absence and there are 2.6 million people on Incapacity Benefit. This costs over £100 billion per annum, more than the annual budget of the National Health Service (NHS) [Black, 2008]. To date, responses to this issue have prioritised "treatment" interventions (e.g. return to work interventions for those on sickness absence). Interventions to "prevent" the onset of work related ill health, or to use the workplace as a site of health promotion have been largely absent or left to the discretion of individual employers. In this context, the Sports Council for Wales 'Active Workplace Challenge', a publicly funded and organised programme which promotes physical activity in the workplace is novel. The health and wellbeing benefits of physical activity are well known (Department of Health, 2004). However, it is less clear how the workplace can be used as a site of promoting physical activity, and what the effects of such interventions are on employees and employers.

2. Research Questions

To assist in the evaluation on the Sports Council for Wales' 'Active Workplace Challenge', this literature review maps out the evidence base on the health, wellbeing and organisational effects of workplace physical activity interventions. Specifically it summarises the evidence base relating to the following research questions:

1. Can workplaces be utilised to increase physical activity levels amongst adults?
2. What other (if any) health benefits do workplace based physical activities have?
3. What impact do workplace physical activity interventions have on the organisations that introduce them?
4. What are the barriers to, and motivations of, employees undertaking physical activity in the workplace?
5. Which workplace interventions are most effective in attracting different demographic groups and why?
6. What workplace interventions are most effective in particular workplace contexts and why?
7. What factors are critical to the success (or otherwise) of workplace physical activity interventions?
8. What support do employers need when considering, creating and running workplace physical activity interventions?

3. Methods

There are two main evidence bases upon which this literature review draws: the occupational public health evidence base and the health promotion evidence base. For example, in the Web of Science sub-category "public, environmental and occupational health", 764 hits are obtained for systematic reviews published between 2000 and 2008. Therefore, it was determined that it would be most efficient to synthesise existing systematic review level evidence (a rapid umbrella evidence review) rather than focusing on primary studies. Umbrella reviews are becoming increasingly popular ways of summarising large and diverse literatures (for examples see Bambra et al, 2009; Main et al, 2008; Morrison et al, 2003). The Cochrane collaboration also acknowledges the importance of umbrella reviews, particularly in terms of presenting the overarching findings of existing systematic reviews (Higgins and Green, 2008).

3.1. Inclusion and Exclusion

In this rapid umbrella evidence review, we searched for systematic reviews of the effects of, or barriers to, workplace-delivered physical activity interventions aimed at the general working age population, in any developed country, published in English. Given the size of the evidence base we limited publication dates to 2000 – 2009. Reflecting the remit of the 'Active Workplace Challenge', physical activity interventions included: purchase of pool bicycles for staff use; introduction of bicycle purchase salary sacrifice schemes; purchase of bicycle equipment and storage; construction/refurbishment of showers and changing rooms; activity coordinator roles and recruitment of 'workplace physical activity champions'; maps, calorie counters and pathways; sports equipment;

construction/refurbishment of gyms; purchase of gym equipment; workplace physical activity sessions; and promotion and signposting of existing activities.

Given the remit of the 'Active Workplace Challenge', the primary health outcome was increased physical activity levels (research question 1). However, to address research question 2, a wider range of health outcomes were considered as secondary outcomes including changes in the prevalence of specific diseases (such as musculoskeletal disease) as well as more general or indirect measures of physical or psychological health and wellbeing (such as GP visits, health care costs or general health). Sickness absence and injuries resulting from accidents were also included. Given the focus on health promotion and the prevention of ill health via exercise, studies relating to workplace physical activity or exercise interventions for people with an existing health problem (such as lower back pain) were excluded. Further, organisational outcomes affecting employers and employees (such as performance, job satisfaction etc) were also included (research question 3) as were studies which discussed motivations and barriers to participation (research question 4) or differences in participation by population sub-group (research question 5) or type of workplace (research question 6).

Following Database of Abstracts of Reviews of Effects (DARE) guidelines, and recently published umbrella reviews (Bambra et al, 2009; Main et al, 2008; Morrison et al, 2003) we defined studies as systematic reviews if:

- they addressed a clearly defined question (with participants, the intervention, the outcomes and the study designs all defined)

- an effort had been made to identify all relevant literature by searching at least one named database combined with either checking references, hand-searching, citation searching, or contacting authors in the field

3.2. Search strategy

Electronic searches were combined with manual searches.

Electronic searches

All electronic databases were searched from January 2000 to October 2009. For those databases amenable to electronic searches (Cochrane Database of Systematic Reviews [CDSR], Web of Science [WoS], Medline, Database of Abstracts of Reviews of Effectiveness [DARE]), a simple search strategy was utilised due to time restrictions: only keywords/topics were searched using a small number of search terms as full text searches produced too many hits. Setting terms (work or workplace) were combined with intervention terms (physical activity or exercise) (Box 1).

BOX 1: SEARCHES	
CDSR (keywords):	work AND physical activity work AND exercise
Medline (topics):	workplace AND exercise workplace AND physical activity
WoS (topic):	workplace AND exercise workplace AND physical activity

Manual searches

In addition, the National Institute of Health and Clinical Excellence, the EPPI-Centre database of health promotion and public health, and the Campbell Library of Systematic Reviews websites were manually searched for studies published between January 2000 and October 2009.

3.3. Data extraction

One reviewer performed the searches and screened all titles and abstracts identified from the literature search for relevance (n=1144) (for details see Appendix 1). Full paper manuscripts of studies that were considered relevant were obtained (n=65) and assessed for inclusion. Only studies meeting all the inclusion criteria were data extracted (n=12). Data extraction was conducted using standardised data extraction tools (Appendix 2) which recorded:

- bibliographic details
- population and intervention(s)
- the main results
- implementation data
- any policy or practice recommendations

4. Results

Our searches produced a total of 12 relevant systematic reviews. The included reviews are listed in Appendix 3. 11 studies were located using electronic searches; and 1 by manual searches (Appendix 1). Three of the reviews contained information of relevance to research question 1, eight covered outcomes of relevance to question 2, three related to question 3, one covered material of relevance to research question 4, two were relevant for question 5, one covered research question 6, one covered question 8. However, no systematic review covered research question 7. How each review relates to the different research questions is detailed in Table 1.

TABLE 1: HOW THE REVIEWS RELATE TO THE RESEARCH QUESTIONS

Research Questions		1 Effects on physical activity	2 Effects on health	3 Effects on the organisation	4 Barriers	5 Demographic and social groups	6 Workplace context	7 Success Factors	8 Employer support
Reviews	Bell and Burnett 2009		X						
	Benedic and Arterburn 2008		X						
	Bigos et al. 2009		X						
	Dugdill et al. 2007	X			X		X		X
	Engbers, et al. 2005	X							
	Kuoppala et al. 2008		X	X					
	Maher 2000		X						
	Proper et al. 2002			X					
	Proper et al. 2003	X	X						
	Robroek et al. 2009					X			
	Tveito 2004		X	X					
	van Poppel et al. 2004		X						

4.1. Effects of workplace interventions on physical activity

Three of the reviews (Dugdill et al, 2007; Engbers et al, 2005; Proper et al, 2003) examined the effects of workplace physical activity interventions on physical activity outcomes.

Dugdill Review

The Dugdill et al review (2007) was commissioned by the National Institute of Health and Clinical Excellence (NICE) and was used as the basis for their public health guidance on how to promote physical activity in the workplace (NICE, 2008). The Dugdill review followed the standard NICE review methodology. Twelve electronic databases were searched for studies from any country published 1996 – 2007. 26 primary quantitative studies of the effectiveness of workplace physical activity interventions were identified. These related to six types of intervention: stair walking, walking, active travel, health checks, counselling, employee designed interventions, health information messages, and group activity sessions.

Seven studies examined the effects on physical activity outcomes of workplace stair walking interventions in both public sector and private sector workplaces. These interventions typically involved the use of health signs - posters or other forms of communication (letters, emails, doctor letters) promoting stair (instead of lift) use. The studies were observational (before and after studies with/without controls). Four of the studies found that the use of health signs had a positive effect on stair use, but in two of these studies, the effects were only short term. Two other studies reported a decline in stair use after the intervention, and one reported no change in stepping behaviour.

Four studies looked at workplace walking interventions – the use of pedometers and goal setting, walking diaries, and workplace walking routes. The two observational studies and two randomised controlled trails (RCTs) suggested that these interventions can be effective in increasing the step count of employees. All four studies were located within public sector workplaces.

Two quantitative studies (one RCT, one observational) examined the effects on physical activity of active travel interventions. The RCT found that the use of written health materials promoting walking and cycling to work increased walking to work (but not cycling) amongst public sector employees (who were largely economically advantaged women). The observational study found that a social marketing campaign to promote walking and cycling to work had no effect on these activities amongst employees.

Six observational studies found that workplace health checks (combined with other interventions such as counselling) can have a small positive impact on physical activity rates.

Two RCTs of the effects of workplace counselling on physical activity were conflicting: one found a positive impact on physical activity, whilst the other reported no intervention effect.

One observational study found that employee designed interventions (stair use, health education materials etc) can have a positive effect on physical activity, health information messages, and group activity sessions.

The two studies (one RCT, one observational) of health information messages (by email or print) were inconclusive as an intention to treat analysis within the RCT found no

significant intervention effect on physical activity rates, whereas the observational study reported an increase in physical activity amongst those who received physical activity promotion emails. One RCT of delivering health information via regular workshops suggested a positive impact on physical activity rates.

The review included two studies of supervised group physical activity sessions. Both studies were of women. An RCT of 12 weekly sessions of moderate aerobic and muscle training found short-medium term increases in physical activity rates but these were not sustained in the longer term (3 years post). The other study, an observational study of light aerobic sessions held over 12 weeks, found no significant effect on physical activity levels.

Engbers Review

The Engbers et al review (2005) examined worksite health promotion programmes which employed environmental strategies (environmental strategies are aimed at reducing barriers or increasing opportunities for healthy choices and activities, unlike individual interventions, they do not require opt in). Two electronic databases were searched for trials from any country published 1985 – 2004. In total 13 RCTs of the effectiveness of environmental workplace health promotion programmes were located. These were all multi-intervention studies, three of which included physical activity interventions alongside other interventions such as health education or healthy eating policies in work canteens.

One study of white collar public sector workers found that using posters to encourage the use of stairs (as opposed to lifts) had a positive effect on self-reported exercise. This

study also involved educational and nutritional interventions. A second study of blue collar manufacturing workers examined the introduction of a walking track on company grounds. This study also included counselling and nutritional interventions. However, there was no change reported by employees in terms of their ability to exercise or in exercise behaviour. The third study of blue and white collar workers evaluated the introduction of exercise space and equipment at the worksite and a workplace walking route, alongside more general health education and increasing the availability of healthy food. This study found a significant increase in exercise behaviour and activity.

Caution should be applied to the findings of these studies though as it is difficult to tell whether the positive outcomes were simply a result of the physical activity interventions, as there were so many concurrent interventions. The authors concluded that the evidence was inconclusive.

Proper Review

The Proper et al review (2003) examined worksite physical activity programmes. Five electronic databases were searched for trials from any country published 1980 – 2000. In total 26 RCTs and non-randomised Controlled Trials (NCT) were located. Eight of these reported on physical activity outcomes. Many of these studies were multi-interventional, combining physical activity interventions alongside other health promotion interventions such as health education or counselling. Further, the reference groups often experienced a non-physical activity health promotion intervention (as opposed to no intervention).

Two of the studies of manufacturing workers examined the effects of individual counselling and education interventions (such as physical activity promotion emails). They found that the interventions improved physical activity rates. Similarly, of the six studies which looked at the introduction of low to moderate aerobic exercise programmes (typically 12 weeks duration) within the workplace (either individual or group), three reported significant improvements in physical activity (measured as energy expenditure or self-reported exercise rates). The other two studies of exercise programmes found no significant change as did the one study of a workplace walking scheme. However, as the better quality studies had positive outcomes. The authors concluded that there was strong RCT level evidence showing the effectiveness of workplace physical activity interventions in improving physical activity rates.

4.2. Effects of workplace physical activity interventions on other health outcomes

Nine reviews were assessed in addressing this research question. Many of the reviews could not find convincing evidence and the authors noted a range of limitations and poor quality studies which made strong recommendations inappropriate.

Back Pain and Lower Back Pain

A number of the reviews focused on back pain (BP) and lower back pain (LBP) which is recognised as one of the most costly and difficult conditions to manage. Bell et al (2009) found that there was strong evidence that exercise was effective in reducing the severity and activity interference from LBP. However, due to the poor methodological quality of studies (only two of the 15 studies were considered of appropriate quality) and

conflicting results, there was only limited evidence supporting the use of exercise to prevent LBP episodes in the workplace. Other methodological limitations included differing combinations of exercise, study populations, participant presentation, workloads and outcome measures, levels of exercise adherence, lack of reporting on effect sizes, adverse effects, and types of sub-groups; thus making it difficult to draw definitive conclusions on the efficacy of workplace exercise in preventing LBP. One major issue is to secure adherence to any exercise programme that is initiated in the workplace. The research calls for specific initiatives to target sub groups of users rather than a 'one size fits all' approach and promotion.

Bigos et al (2008) conducted a systematic review of interventions to prevent BP episodes in working age adults. Twenty high-quality RCTs found strong, consistent evidence that exercise was the only intervention that reduced BP. Functional outcomes such as work absence (which was positive in three exercise studies), were found to be more meaningful measures of impact than relying on symptoms reports alone. This has also been reinforced in other research which highlights the benefit to individuals and organisations.

van Poppel et al (2004) found limited evidence on the efficacy of exercise and moderate impact. Exercise was found to have a positive effect but the studies were generally of low methodological quality. This updated study added 5 reviews to an earlier review but only one was of high quality. Interventions such as education were not found to have any significant effect on outcome measures such as absenteeism due to BP. The review also raises the question that general programmes are likely to be less effective than

individually tailored ones. This could tackle the question of compliance which is poor in all except individuals who are already physically active.

Proper et al (2003) conducted a review of the literature with respect to the effectiveness of worksite physical activity programmes on physical activity, physical fitness, and health. The review, which differs from others by using a qualitative assessment approach, looked at 26 interventions, although only 6 studies were of high quality. This found strong evidence for a positive effect of a worksite physical activity programme on physical activity and musculoskeletal disorders. Limited evidence was found for a positive effect on fatigue. For physical fitness, general health, blood serum lipids, and blood pressure, inconclusive or no evidence was found for a positive effect. However the authors go on to support the implementation of worksite physical activity programmes as a means of enhancing general physical fitness levels.

The authors highlighted their finding that there is strong evidence for the effectiveness of workplace physical activity programmes on reducing musculoskeletal disorders and this contradicts other results in the literature regarding the associations between physical activity, physical fitness, and lower back pain. The authors offer explanations for this, including differences in methodology and again recognise that the methodological quality of most studies is poor.

Maher (2000), in a review of 13 RCTs to investigate the efficacy of workplace interventions to prevent LBP in workers, found that trials suggest that workplace exercise is effective. However it was also found that back braces and education are ineffective, and workplace modification plus education is of unknown value in preventing LBP. However the trials often do not extend far enough in time and in research

questions. For example, as there has been no direct comparison of exercise programmes or analysis of their cost-benefit, it is not possible to say which exercise programme is most effective and for which groups or employees. This makes it difficult to establish a strong rationale for particular workplace interventions as well as the targeting and design of any interventions.

Work ability and wellbeing

Kuoppala et al (2008) reviewed 46 studies in a meta-analysis. The aim was to study the association between work health promotion and job wellbeing, work ability, absenteeism, and early retirement. However the results quality was considered good in only 3 studies. As a consequence, the evidence on the effects of health promotion was mostly weak. The evidence evaluated in this review did give support to the idea that workplace health promotion increases mental wellbeing but not physical well-being and wellbeing in general. Educational and psychological health promotion activities applied in isolation were not found to be effective. Health initiatives were found to be valuable for some individual wellbeing and in reinforcing the supportive group values generated in places of work. It was concluded that workplace health promotion should target both physical and psycho-social environments at work. However most studies were not heterogeneous, not high quality in terms of methodology and clarity and so there are questions around the findings. Indeed where the studies were considered to be high quality, the results in terms of outcomes were weak.

4.3. Effects of workplace physical activity interventions on organisational outcomes

Workplace health promotion activities have been recognised by some employers as worthwhile and profitable, and motivations to support programmes have been reported to be high among employees, employers, and occupational health service providers. They recognise their responsibilities toward the health and safety of the employees, and they expect their investments in employee health to reduce absenteeism, reduce accident and disability rates, increase productivity, reduce health insurance costs, reduce workers' compensation, enhance job satisfaction, and improve company's image.

Health promotion has been recognised as one of the key means to overcome the consequences of the challenges of job performance and wellbeing at work. Kuoppala et al (2008) note that it represents a more effective means than individual counselling, because it addresses groups rather than individuals and because working communities are social formations with potential for collective consideration of proposals, joint decision making and action, and mutual support for initiation and enhancement of sustainability.

The meta-analysis review of 46 studies by Kuoppala et al found that work health programmes seem to promote work ability and moderate evidence that they decrease sickness absences. Ergonomics initiatives also appear to have an effect and can contribute towards improved work ability and productivity in terms of decreased absence. The authors suggest that workplace initiatives and promotions should combine physical and psycho-social targeting. Evidence from this review on job wellbeing was nearly nonexistent, and there was no evidence on early retirement effects. In general

the authors advised that interventions and programmes might be best if integrated into company policies and functions. Despite the general weakness of evidence, it appeared from the studies that work health promotions do affect employees' ability to work and is worthwhile at workplaces.

However the results from the review by Tveito et al (2004) showed that there is a need to be careful when considering interventions aiming to assist employees, in this case to prevent LBP among employees. Of all the 28 workplace interventions covered in this review, only exercise and the comprehensive multidisciplinary treatment interventions had a documented effect on LBP. This was seen through a range of organisational effects on sick leave, costs and new episodes of LBP. However there was no documentary evidence on positive organisational outcomes through employees as a result of educational or other non exercise interventions which could have been thought to consolidate the effects of exercise and spread the positive messages as well as improve the sustainability of effects.

Many employers in many countries are introducing wellness or well-being programmes and they often include weight loss and exercise. This is often done in an effort to reduce the costs of illness and absenteeism. Evidence of the effects of these is limited, often anecdotal and previous studies have indicated little sustainable impact in terms of effectiveness.

Benedict and Arterburn (2007) conducted a systematic review to assess the quality and effectiveness of recently published evidence on worksite interventions for weight control. They identified 11 suitable intervention studies for review from a population of over 1,000 published in English between 1994 and 2006. However the overall quality of these

studies was poor and none provided data on costs, cost-benefit or return on investment (ROI) of weight loss interventions from the employer's perspective.

The results revealed a wide variety of characteristics of interventions and participants covering gender, age (32-52), employee settings and countries, mean baseline weight, and mean body mass index (BMI). Of the qualifying studies, seven were RCTs, two were NCTs, and two were uncontrolled case series. Most of the trials were multi-intervention in focus, including education and individual or group counselling to change diet and increase physical activity. Single intervention programmes included aerobic exercise training programmes, low-calorie diets and meal replacement. Durations ranged from 2 to 18 months and most of the interventions were of low intensity. There was no detail on context of intervention (e.g. if employees were given time off or did it in their own time).

There was a lack of information on important details such as participation and attrition rates. In general, mean weight loss and changes in BMI were significantly greater in the intervention group compared with the controls. In controlled trials reporting mean weight change, the intervention groups lost an average of 1.0 to 6.3 kg, whereas changes in the control groups ranged from a loss of 0.7 kg to a gain of 0.5 kg. Only one trial specifically looked at weight maintenance and reported significant weight regain in both intervention groups in the 12 weeks following an initial weight loss period.

Four high-intensity programmes all resulted in significant weight loss, whereas only one of five low-intensity programmes reported significant differences compared with control groups. No studies evaluated the effects of various subject characteristics, such as gender, age, or white- or blue-collar status on weight loss.

This review suggests that worksite-based programmes can be effective for modest, short-term weight losses among subjects who complete the programmes, findings that are consistent with earlier published reviews. Most of the studies identified did not evaluate weight loss beyond 6 months or consider the issue of weight maintenance so sustainability of the weight loss effects is unclear. Programme effectiveness appeared to be at least partly related to the intensity of the intervention; interventions that incorporated face-to-face contact with participants more than once a month appeared to be more effective.

Despite the generally positive short-term results for these programmes, the available studies were weak methodologically. Questions remain as it is not yet clear whether worksite or employer based programmes focused on weight loss definitively reduce obesity or result in relevant positive business outcomes and economic impact. The potential exists, especially to assist in prevention, but it is clear that further scientifically robust research is required to show that long term effects are generated and sustained. There is a concern that the focus on short term effects overestimates impact, especially as most weight loss occurs within the first six months and then tends to be regained thereafter.

Proper et al (2002) conducted systematic reviews of the literature on the effectiveness of physical activity programmes at worksites with respect to work-related outcomes. Eight studies (4 randomized controlled trials and 4 controlled trials) were identified, but their methodological quality was generally poor. The outcomes were absenteeism, job satisfaction, job stress, productivity, and employee turnover. The evidence of an effect

was limited for absenteeism, inconclusive for job satisfaction, job stress and employee turnover, and nil for productivity.

Despite this, many employers do perceive that they gain positively and experience benefits from enhancing physical activity among their employees. Differences between the research findings and employer perceptions may be indicative of the deeper psychological processes at play and also differences in definition of outcomes, measurement of benefits and tracking for evidence objectively over time (compliance). For example, Proper et al found no evidence to indicate an effect of physical activity programmes at worksites on productivity. However in all studies they did note encouraging positive trends.

Behaviour change is difficult, and dropout rates from workplace physical activity interventions can be high and are often ignored, which results in an over-estimation of the effects in organisations. Compliance tracking is often omitted along with specific intervention development plans that could suit specific physical requirements, such as intention-to-treat programmes. Again the quality of evidence can be questioned, as shown by the studies in the Proper review which suffered from small and biased samples or lack of appropriate control observations.

Most of the studies identified did not randomize their subjects into an intervention or reference group; often compared participants and nonparticipants, without controlling for baseline differences, personality, and other differences between these groups. However Proper and others emphasise that other factors must also be considered. The experience of workers with regard to their productivity does not necessarily reflect what they actually produce or what the organisation expects by way of productivity.

Proper et al (2002) also raised the point that published studies tend to present more positive results while unpublished studies probably more often have negative results. Thus we should consider sourcing unpublished evidence to check and reduce the concern that there may be a danger of an overrepresentation of positive effects of physical activity programmes at worksites in mainstream reviews.

4.4. Barriers and motivations

Only the NICE commissioned review by Dugdill et al (2007) reported on barriers to undertaking physical activity in the workplace. It included seven studies (1 RCT, 2 qualitative, 4 observational) which reported on two types of barriers to the implementation of work place physical activity interventions: psychological barriers (e.g. negative perceptions of stair climbing messages, low perceptions of fitness) and physical barriers (e.g. absence of showers and changing areas, lack of safe cycle routes). One further study (observational) noted that one motivating factor for the participation of employees was if an intervention was worthwhile and enjoyable.

4.5. Attracting different demographic and social groups

One review (Robroek et al, 2009) examined whether physical activity interventions were more effective at attracting certain different demographic and/or social groups than others. This review compared the characteristics of participants and non-participants in worksite health promotion programmes aimed at improving physical activity (and nutrition). Two databases were searched for studies from 1988 to 2007. A total of 23 quantitative studies were located (2 RCTs, 21 observational studies). Ten studies looked at participation in education or counselling programmes (e.g. emailed health messages,

one to one counselling etc), six studies looked at access to fitness centres and seven looked at multiple interventions. Participation levels in the studies varied from 10% to 64% with a median participation rate of 33%. A meta-analysis was performed which showed that participation levels were 67% higher amongst women than men (OR = 1.67, 95% CI 1.25 – 2.27) for the education, counselling and multiple interventions. However, there was no gender difference for access to fitness centre interventions. The meta-analysis also showed no differences in participation rates by age (old v young or middle aged v young), education (moderate/high v low), income (high v low) ethnicity (white v non-white), or marital status (married v other).

4.6. Variation by workplace context

Only the NICE commissioned review by Dugdill et al (2007) commented on whether studies looked at variation by workplace context. No studies indicated whether the type of workplace influenced the effectiveness of physical activity interventions.

4.7. Success factors

None of the included reviews commented on what factors were important in terms of the success or otherwise of the interventions.

4.8. Employer support

The NICE review by Dugdill and colleagues (2007) covered this question and looked for studies which analysed employers views on what would help them to organise and promote physical activity interventions in the workplace. However, this comprehensive

systematic review found that no specific studies on the topic and that of the numerous studies of effectiveness that it included, none commented on employer support: "There were no opinions given by employers that explained how employers could promote physical activity in the workplace" (Evidence statement 17 in Dugdill et al, 2007).

5. Conclusions

Many of the studies we located were inconclusive and calls for further research were common. However, we summarise the key findings below in relation to each of the key research questions addressed.

5.1. Can workplaces be utilised to increase physical activity levels amongst adults?

The comprehensive NICE review of 26 studies by Dugdill et al (2007) found positive effects on physical activity of workplace stair walking interventions, workplace walking interventions and workplace health checks. Evidence on active travel, workplace counselling, health information messages and group exercise sessions was limited and conflicting. Based on eight studies, the Proper et al (2003) review of worksite physical activity interventions concluded that there was strong evidence that worksite exercise programmes can improve levels of physical activity amongst employees. Based on three studies, Engbers et al (2005) found that there was inconclusive evidence about the effects of environmental physical activity interventions. The balance of the review level evidence therefore suggests that workplaces can improve physical activity levels amongst employed adults and that workplace exercise programmes and health promotion messages appear to be the most effective interventions.

5.2. What other (if any) health benefits do workplace based physical activities have?

Most of the reviews could not find convincing evidence or robust methodologies to draw policy conclusions. A number of the reviews focused on back pain (BP) and lower back pain (LBP) which is recognised as one of the most costly and difficult conditions to manage. However it has been found difficult to draw definitive conclusions on the efficacy of workplace exercise in preventing LBP, although there is evidence that it can reduce the intensity. A study by Bigos et al (2008) of twenty high-quality controlled trials found strong, consistent evidence that exercise was the only intervention that reduced BP and can be best measured through functional outcomes such as work absence. van Poppel et al (2004) found strong evidence for a positive effect of a worksite physical activity programme on physical activity and musculoskeletal disorders. This backed up similar evidence from Proper et al (2003) however there is concern over the low quality of studies and methodological weaknesses and limitations. Studies of randomised control trials, such as Maher (2003) suggest that workplace exercise is effective but poor methodologies make it difficult to establish a strong rationale for particular workplace interventions as well as the targeting and design of any interventions. Where the studies were considered to be high quality, the results in terms of outcomes were weak.

5.3. What impact do workplace physical interventions have on the organisations that introduce them?

A meta-analysis review of 46 studies by Kuoppala (2004) found that work health programmes seem to promote work ability and moderate evidence that they decrease

sickness absences. The authors suggest that workplace initiatives and promotions should combine physical and psycho-social targeting. A review by Tveito (2004) found that only exercise and the comprehensive multidisciplinary treatment interventions (in this study to tackle lower back pain) had a documented effect.

Many employers in many countries are introducing wellness or well-being programmes and they often include weight loss and exercise. Benedict and Arterburn (2007) conducted a systematic review to assess the quality and effectiveness of recently published evidence on worksite interventions for weight control. This review suggests that worksite-based programmes can be effective for modest, short-term weight losses among subjects who complete the programmes; findings that are consistent with earlier published reviews. However most of the studies identified did not evaluate weight loss beyond 6 months or consider the issue of weight maintenance so sustainability of the weight loss effects is unclear. Questions remain, as it is not yet clear whether worksite or employer based programmes focused on weight loss definitively reduce obesity or result in relevant positive business outcomes and economic impact.

Proper et al (2002) conducted systematic reviews of the literature on the effectiveness of physical activity programmes at worksites with respect to work-related outcomes. The evidence of an effect was limited for absenteeism, inconclusive for job satisfaction, job stress and employee turnover, and nil for productivity.

5.4. What are the barriers to, and motivations of, employees undertaking physical activity in the workplace?

Review level evidence on this question is limited as only the NICE commissioned review by Dugdill and colleagues (2007) addressed it. Seven studies identified psychological and physical barriers. It also noted that one motivating factor for the participation of employees was if an intervention was worthwhile and enjoyable.

5.5. Which workplace interventions are most effective in attracting different demographic groups and why?

The review by Robroek et al (2009) found that participation levels in physical activity interventions varied from 10% to 64% (average of 33%). Participation levels were 67% higher amongst women than men for counselling and education interventions. There was no gender difference for fitness centre interventions. No differences in participation rates by age, education, income, ethnicity, or marital status were found.

5.6. What workplace interventions are most effective in particular workplace contexts and why?

The NICE commissioned review by Dugdill and colleagues (2007) found no evidence on this question.

5.7. What factors are critical to the success (or otherwise) of workplace physical activity interventions?

No systematic review level evidence was found of relevance to this question.

5.8. What support do employers need when considering, creating and running workplace physical activity interventions?

The one systematic review which covered this question found no evidence on employer's views of what support was needed to facilitate workplace physical activity interventions.

6. Recommendations

It is clear that certain workplace physical activity interventions are effective. NICE has recently released public health guidance on physical activity in the workplace (based on the Dugdill evidence review). This is summarised in Box 2 below.

BOX 2: NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE PUBLIC HEALTH GUIDANCE ON "*HOW TO ENCOURAGE EMPLOYEES TO BE PHYSICALLY ACTIVE*".
Recommendation 1: policy and planning
Workplaces should develop an organisation-wide plan or policy to encourage and support employees to be more physically active. This should include measures to maximise the opportunity for all employees to participate; be based on consultation with staff and should ensure they are involved in planning and design, as well as monitoring activities, on an ongoing basis; be supported by management and have dedicated resources; set organisational goals and be linked to other relevant internal policies (for example, on alcohol, smoking, occupational health and safety, flexible working or travel); link to relevant national and local policies (for example, on health or transport).
Recommendation 2: implementing a physical activity programme
Workplaces should introduce and monitor an organisation-wide, multi-component programme to encourage and support employees to be physically active. This could be part of a broader programme to improve health. It could include: flexible working policies and incentive schemes; policies to encourage employees to walk, cycle or use other modes of transport involving physical activity (to travel to and from work and as part of their working day); the dissemination of information (including written information) on how to be more physically active and on the health benefits of such activity. This could include information on local opportunities to be physically active (both within and outside the workplace) tailored to meet specific needs, for example, the needs of shift workers; ongoing advice and support to help people plan how they are going to increase their levels of physical activity; the offer of a confidential, independent health check administered by a suitably qualified practitioner and focused on physical activity.
Recommendation 3: components of the physical activity programme
Workplaces should encourage employees to walk, cycle or use another mode of transport involving physical activity to travel part or all of the way to and from work (for example, by developing a travel plan). Help employees to be physically active during the working day by: where possible, encouraging them to move around more at work (for example, by walking to external meetings); putting up signs at strategic points and distributing written information to encourage them to use the stairs rather than lifts if they can; providing information about walking and cycling routes and encouraging them to take short walks during work breaks; encouraging them to set goals on how far they walk and cycle and to monitor the distances they cover; take account of the nature of the work and any health and safety issues.

Recommendation 4: supporting employers
Public health practitioners, local strategic partnerships, private, statutory and voluntary organisations, trades unions, business federations, and chambers of commerce should offer support to employers who want to implement this guidance to encourage their employees to be more physically active. Where appropriate and feasible, this should be provided on the employer's premises. It could involve providing information on, or links to, local resources. It could also involve providing advice and other information or resources (for example, the services of physical activity experts). If initial demand exceeds the resources available, focus on: enterprises where a high proportion of employees are from a disadvantaged background; enterprises where a high proportion of employees are sedentary; small and medium-sized enterprises.

7. Umbrella review limitations

Given the time restraints, the electronic searches were limited to key databases and to publications since 2000. Some relevant references, or older studies, may have been missed (although the reviews themselves include earlier studies e.g. Proper et al, 2003 included studies published since 1980). Perhaps most importantly, research questions 7 and 8 (and to a lesser extent research question 4) would be best answered through qualitative research with employers and employees. However, given the time frame and the multiple questions to be addressed, our searches were only for systematic reviews (the highest level of evidence) and many of these did not include qualitative studies in their inclusion criteria. It is likely on this basis that qualitative studies in this area will have been missed. However, the NICE review by Dugdill et al (2007) was multi-method (it looked for both qualitative and quantitative studies) and it found no studies on research question 7 and very little of relevance to research questions 4 and 8 so it is likely that any evidence base in these areas is very small. This umbrella review is therefore not exhaustive but it is extensive, sensitive and specific. It needs to be acknowledged that umbrella reviews have inherent limitations as there is clearly a risk that bias is transmitted upward from primary studies, to systematic reviews and then to umbrella reviews.

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Appendix 1: Results of electronic and manual searches

Electronic Search Results

Database	Number of Hits	Relevant abstracts retrieved (n)	Full papers retrieved (n)	Included reviews (n)*
Medline	557	87	31	
CDSR	39	5	2	
WoS	480	55	23	
DARE	26	10	6	
Total	**1102**	157	62	**11**

*Duplicates removed

Manual search results

Database	Number of Hits	Relevant abstracts retrieved (n)	Full papers retrieved (n)	Included Reviews (n)
EPPI	14	5	0	0
NICE	21	3	2	1
CLSR	7	1	1	0
Total	**42**	**9**	**3**	**1**

Appendix 2: Sample data extraction tool

1. Bibliographical details	
Author	
Year	
Title	

2. Review details	
Population	
Intervention(s)	
Number of studies in review	
Method of synthesis (meta-analysis or narrative)	

3. Main Results	
Health outcomes and effects.	

4. Implementation	
Is any information about the implementation of the intervention?	

5. Policy recommendations	
What specific policy recommendations are made?	

Appendix 3: List of included reviews

Bell, JA, Burnett, A, 2009. Exercise for the Primary, Secondary and Tertiary Prevention of Low Back Pain in the Workplace: A Systematic Review. Journal of Occupational Rehabilitation. 19, 8-24.

Benedict, MA, Arterburn, D, 2008. Worksite-based weight loss programs: a systematic review of recent literature. Am J Health Promot. 22, 408-416.

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Appendix 4: Good practice messages from grey literature

The literature review synthesised existing systematic review level evidence on workplace physical activity. This ensured that all literature included in the review had been assessed for robustness of methodology and findings. In addition to the review level evidence, there is a growing amount of 'grey' literature[1] regarding workplace health, of which physical activity is an important component.

To ensure the evaluation was informed by all relevant evidence, whilst not compromising the integrity of the literature review, we reviewed the grey literature for further evidence in relation to the questions addressed in the literature review.

We undertook internet searches to identify reports, papers and websites with relevant evidence. These all related to workplace health in its entirety, but physical activity figured as one of the fundamental components of a employers' approaches to workplace health. Only one report (Evaluation of Well@Work) investigated the impact of physical activity programmes as standalone interventions. The other reports provided useful data on business benefits, but these related mainly to multi-faceted approaches to workplace health which included physical activity alongside other occupational health and wellbeing interventions.

[1] [1]That which is not academically published, but may have been commissioned by government departments and other organisations. Grey literature is often relatively recent in nature.

Can workplaces be utilised to increase physical activity levels amongst adults?

The Evaluation of Well@Work and Business in the Community's Healthy People = Healthy Profits report both highlight the value of using the workplace to encourage greater physical activity. The Well@Work evaluation methodology looked at pre and post intervention activity levels, and a number of physical activity projects had succeeded in raising the levels of physical activity.

What other (if any) health benefits do workplace based physical activities have?

The Well@Work projects reported that physical activity was the easiest workplace health intervention to 'sell' to staff, as it was fun, enjoyable and sociable. Therefore it may be a useful as a precursor to introducing broader workplace health initiatives.

What impact do workplace physical activity interventions have on the organisations that introduce them?

None of the reports provide definitive evidence of business benefits from physical activity programmes, although employers' motivations for introducing workplace health and physical activity interventions included reducing absence and improving productivity.

Anecdotal evidence, from employers featured in Business in the Community's Healthy People = Healthy Profits report, indicate that physical activity programmes (as part of wider workplace health initiatives) have provided benefits in terms of:

- Reduced sickness absence
- Reduced staff turnover (linked to improved morale and improved company image as an 'employer of choice'

Research by the World Health Organisation (WHO) provides evidence of measurable business improvements arising from wider workplace health initiatives, but acknowledges the role of physical activity as an important component. Observing participating employers' performance over an average of more than 3 years each, the research showed an average:

- 27% reduction in sickness absence
- 26% reduction in sick leave costs
- 32% reduction in workers' compensation and disability claims

The Evaluation of Well@Work showed that the majority of employers were planning to continue their projects after the end of the funding period. This suggests that they benefited from the initiative.

What are the barriers to, and motivations of, employees undertaking physical activity in the workplace?

There is some useful evidence from the Evaluation of Well@Work, listed below. Recent research with workplace health practitioners and employers in the north east of England agrees with these findings.

Barriers

- convenience and timing – e.g. shift workers and part time workers are often excluded from activities that take place during the 'normal' working day
- inflexibility of working time – e.g. factory workers, those operating machinery and healthcare workers are on set break times without the opportunity to flex their schedules to fit in exercise
- cost
- large time commitment

Motivations

- social aspect and peer support
- friendly competition, associated with challenges and team events
- convenience
- low or no cost
- opportunity to try something new
- when an activity is seen as meeting staff's needs and interests
- being involved in the design and implementation of activities

Which workplace interventions are most effective in attracting different demographic groups and why?

and

What workplace interventions are most effective in particular workplace contexts and why?

Our review found no evidence to answer these questions. However, there was evidence about which activities were most successful in general:

- taster sessions
- challenges and competitions
- team based activities

What factors are critical to the success (or otherwise) of workplace physical activity interventions?

The Evaluation of Well@Work suggests that the most successful physical activity programmes are:

- free
- available at convenient times
- require minimal time commitment
- voluntary involvement
- supported by management
- designed to meet the needs and interests of employees

It also highlights the need for employees to feel engaged in the planning and delivery of programmes.

The Move Europe report confirms these factors and also adds the need for:

- wide variety of programmes, accessible to the whole workforce
- ongoing communication between staff and managers about workplace activity programmes
- education about the importance of healthy lifestyle
- ongoing evaluation of workplace physical activity programmes

What support do employers need when considering, creating and running workplace physical activity interventions?

There is little evidence on this question, expect that the collective experiences of the Well@Work projects suggests that many employers benefit from accessing external expertise in designing and implementing workplace health initiatives. Bringing in an external adviser was seen as providing knowledge, experience and existing resources that the employer can utilise.

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