Worksite health promotion in the construction industry

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Chapter 4

Process evaluation of a multifaceted health programme aiming to improve physical activity levels and dietary patterns among construction workers

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Abstract

Objective: To evaluate the process of a health promotion programme, aiming to improve physical activity levels and diet among construction workers.

Methods: The process evaluation was conducted following the RE-AIM framework for the evaluation of the public health impact of health promotion interventions. Effectiveness was assessed on motivational stage-of-change, self-efficacy and decisional balance for physical activity as well as dietary behaviour.

Results: The external validity of the trial was satisfactory with representative reach of workers and adoption of workplace units in the participating construction company. The extent to which the programme was implemented as intended was modest. The intervention was effective on participants' progress through stages of behaviour change.

Conclusions: Based on the RE-AIM dimensions it is concluded that for construction workers the programme is feasible and potentially effective, but adjustments are required before widespread implementation.

Introduction

The worldwide prevalence of overweight and musculoskeletal disorders (MSD) is high [1]. In the Netherlands, prevalence of overweight is over 40% in the adult female population and over 50% in the adult male population [2]. For MSD this is 39% in men and 45% in women [3]. Excess body weight is associated with increased mortality and morbidity rates (e.g. type 2 diabetes, cardiovascular disease, cancer, and MSD) [4-6]. In addition to health-related problems for the individual, overweight as well as MSD are causally related to work-related measures, such as increased sick leave and decreased productivity [7-14]. Consequently, the economic consequences of overweight and MSD are high. In the Netherlands in 2007, back pain alone accounted for an estimated €3.5 billion societal costs [15]. Estimates of annual societal costs of overweight are €500 million direct health care costs, and €2 billion indirect costs, resulting from sick leave and work disability [16,17].

To prevent and reduce these health problems worksite intervention programmes are applied, since these have the potential to reach large groups of the employed population and have shown to be effective in improving health outcomes [18] as well as work-related outcomes [9]. Measuring outcomes of worksite health promotion programmes without providing insight into whether and how programme components are delivered could be considered a black box evaluation. Issues such as translatability and public health impact have been identified as critical. To provide insight into these issues, an important, but infrequently conducted component of evaluating the impact of health promotion interventions, is process evaluation. Process evaluations provide understanding on how and why interventions achieve their effects, how best to conduct intervention programmes to maximise effects, and enhance information on the internal and external validity of the intervention studies.

For newly developed health programmes, knowledge of how a successful or an unsuccessful outcome was obtained will have an impact on future decision making. For example, if the outcome of an intervention is not effective, then it can be attributable to lack of implementation or lack of efficacy of the programme. Especially in intervention studies, assessment and reporting of adherence to an intervention programme (compliance with health programme components) is important, since outcomes of these studies can be biased by the level of adherence to the intervention. Furthermore, it provides insight into feasibility of interventions.

This paper describes the process evaluation of the VIP in Construction intervention, using the RE-AIM (Reach, Efficacy, Adoption, Implementation, and Maintenance) framework. The results of this evaluation can be used to modify the programme for long term implementation. Also, these findings could provide useful information for the design of future intervention studies in a workplace setting.

Methods

Study population

This process evaluation was part of the VIP in Construction study, a randomised controlled trial (RCT) evaluating the multifaceted health programme aiming to improve physical activity levels and dietary patterns among construction workers. Blue collar workers (i.e. construction site and production workers) of a Dutch construction company who attended the voluntary periodical health screening (PHS) at the occupational health service between February 2010 and October 2011 were invited to participate. A total of 314 workers were included. Workers were randomised to an intervention group (n = 162) or a control group (n =152). The study protocol (trial number NTR2095) was approved by the Medical Ethics Committee of the VU University Medical Center Amsterdam (VUmc). The study design and intervention have been described in detail elsewhere [19].

Intervention programme

A worksite intervention was developed, aiming at prevention and reduction of overweight and musculoskeletal disorders (MSD) among construction workers [19]. The VIP in Construction intervention programme was designed following the intervention mapping protocol [20], and key figures within the organisation as well as the target group were involved in the development of the programme. The programme consisted of tailored information, face-to-face and telephone counselling, exercises, and materials designed for the intervention (waist circumference measuring tape, pedometer, Body Mass Index (BMI) card, calorie guide, a cookbook including healthy recipes and knowledge tests, Personal Energy Plan (PEP) forms, and an overview of the company health promoting facilities). The intervention was tailored to the participant's body weight status (BMI and waist circumference), physical activity level, and stage-of-change. The Transtheoretical Model (TTM) is a theory-based, widely used approach for conceptualizing behavioural change [21,22]. For interventions aiming at nutrition and physical activity, it is a widely supported model, allowing stratification of participants based on their readiness to change. Behavioural change progresses through a series of stages (pre-contemplation, contemplation, preparation, action, and maintenance). Participants in these strata of stage-of-change have contrasting levels of readiness to change, which requires different intervening strategies and intensity. Coaching intensity (i.e. number and duration of contacts) was tailored to the participants' stage-of-change for improving physical activity and nutrition by using a quick scan (table 1). Face-to-face and telephone coaching contacts were provided by personal health coaches (PHC), during work hours. Face-to-face coaching contacts took place at the construction sites. The coaching contacts consisted of the following elements: feedback, goal setting, feedback on formulated goals, instructions for self-monitoring, and training instruction.

Table 1. Coaching contact schedule

Stage-of-change	PHC contact schedule	2 weeks	1 month	2 months	3 months	4 months
Pre-contemplation stage	A	Intake (60 min face-to-face)	Follow-up 1 (30 min; telephone)	Follow-up 2 (15 min; telephone)		Follow-up 3 (15 min; telephone)
Contemplation/ Preparation stage	B	Intake (60 min face-to-face)		Follow-up 1 (30 min; telephone)	Follow-up 2 (15 min; telephone)	
Action/maintenance stage	C	Intake (30 min face-to-face)			Follow-up 1 (10 min telephone)	

PHC = personal health coach

Data collection

The process evaluation was conducted using the RE-AIM framework for the evaluation of the public health impact of health promotion interventions [23]. The RE-AIM model assesses 5 dimensions: Reach, Efficacy, Adoption, Implementation, and Maintenance. These dimensions interact to determine the (public health) impact of the programme. Each component was evaluated by qualitative and/or quantitative aspects. Process indicators were measured continuously in a web-based registration system during the intervention period by the coaches, as well as in the first follow-up questionnaire for participants allocated to the intervention group (at 6 months after baseline, following the intervention period). After the follow-up period, four interviews with providers and one interview with key persons in the organisation were held, with an average duration of 30 minutes. Table 2 provides a more detailed explanation of the procedures of the process evaluation.

Table 2. Process evaluation components and levels, their definitions, and data collection methods.

Component		Level	Definition	Data collection
Reach		individual and organisation	number of workers participating in the study, participants' representativeness, and sources and procedures used to recruit employees,	participant baseline data and company data
Effectiveness		Individual	short term (6 months) intervention effects on (determinants of) behaviour change	participant baseline, and 6 months follow-up questionnaire
Adoption		Organisation	distribution of workers participating in organisational units, and context of the programme	direct observation
Implementation	*Dose delivered*	Programme	number of workers that received coaching appointments; number of planned contacts and received materials	participant follow-up questionnaire and coaching registrations
	Fidelity	Programme	extent to which the steps of the coaching programme were delivered as intended (timing and content of the sessions)	coaching registrations and interviews
	Satisfaction	Individual	satisfaction of participants, who received the coaching, towards the programme, the coaching's competences, number of coaching contacts, and the programme materials	participant follow-up questionnaire
	Dose received	Individual	exposure to the intervention: number of workers who attended the coaching contacts, and completed the programme, used materials	coaching registrations and participant follow-up questionnaire
	Participation rate	Individual	proportion of workers allocated to the intervention group that participates in the intervention components	programme and coaching registrations
Maintenance		Organisation	organisational intention for long term implementation	interviews
		Programme	recommendations from intervention providers	interviews

Outcome measures

Table 2 presents how each of the RE-AIM dimensions was evaluated. First, the reach of the programme was studied at individual and organisational level. Next, the effectiveness component evaluates the intervention effectiveness on (determinants of) behaviour change. To assess whether transitions between TTM stages could be induced by the intervention, motivation for change was assessed for PA as well as dietary behaviour. For the purpose of analysis, motivational stage-of-change was categorised into three categories (similar to the tailoring categories for the intervention): pre-contemplation, contemplation/preparation, and action/maintenance. The TTM involves intermediate measures sensitive to progress through the stages as well. These include pros and cons (decisional balance construct) and the self-efficacy construct. Self-efficacy was assessed using one item measured with a 5-point response, where 1 = very confident and 5 = not at all confident. The item addressed the person's degree of confidence in being able to change physical activity and nutritional behaviour. Decisional balance was assessed using one item as attitude towards changing physical activity or nutritional behaviour, with 3 response categories: 'I see more pros than cons', I see as many pros as cons', and 'I see more cons than pros'. In the analysis the last two categories were combined due to a small number of subjects in the last category.

The intention-to-treat analysis of the effectiveness of the intervention on health outcomes (biometric measures and lifestyle) and work-related outcomes (sick leave, work-related vitality) will be described elsewhere. Adoption was studied at organisation level (i.e. business unit and subunit level). Implementation was assessed at the level of either the programme (dose delivered and fidelity) or the individual (satisfaction, dose received, and participation rate). Elements for the assessment of the implementation dimension were defined by an adapted version of the framework of Steckler and Linnan [24]. Finally, Maintenance was considered at both organisation and programme level (see table 2).

Data analyses

Descriptive statistics were used to illustrate the process quantitatively. Furthermore, logistic regression analyses for ordinal variables (proportional odds model) were performed to determine effects of the intervention on stage progression and determinants of behaviour at follow-up, corrected for baseline values. All interviews were audio-recorded and fully transcribed, coded based on the underlying structure of the interview, and subsequently analysed according to the principles of thematic content analyses [25].

Results

Reach

Workers of the company were recruited through the usual communication channels of the company, together with the invitation to the PHS, which was sent with an accompanying letter to the home address. Participation in these screenings is generally high (>85% for this company). During the recruitment period approximately 1,021 workers were invited to the PHS. Based on the number of participants and the number of workers in the company eligible for participation in the study, it was estimated that 31% (314/1,021) of the workers were included. In table 3 baseline characteristics of participants are compared to characteristics of the company workers based on PHS data and company records. Mean age of participants was 46.6 (SD 9.7). Participants were slightly older with an over representation of the age group 50-plus (37% of the company workers versus 46% of the participants) and under representation of the group below 40 years of age (29% of the company workers versus 21% of the participants). BMI levels in the study population reflected those of the company as estimated by the PHS data.

Table 3. Characteristics (age, levels of BMI) of study participants compared to blue collar workers of the construction company, and PHS participants.

	Study (n=314)	Company
Age		
< 20	0%	0%*
20 – 30	7%	9%*
30 – 40	14%	20%*
40 – 50	34%	34%*
50 – 60	42%	31%*
=>60	4%	6%*
BMI		
Overweight (BMI >= 25)	71%	71%**
Obesity (BMI >=30)	23%	21%**

*Based on total company records 2011
**Based on periodical health screening (PHS) data 2010/2011 (n=645)

Effectiveness

Intervention effects on stage-of-change, self-efficacy and decisional balance are presented in table 4. At baseline, based upon the stage-of-change question for dietary behaviour, 52% of the participants were in the action/maintenance stage, 31% in the contemplation/preparation stage, and 17% in the pre-contemplation stage. Proportionately more intervention group participants improved (i.e. moved towards action and maintenance) compared to control group participants from baseline to follow-up (OR: 3.18, 95%CI: 1.82-5.54). After 6 months 74% were in the action/maintenance stage in the intervention group versus 48% in the control group. For physical activity, at baseline 32% of the subjects were in the action/maintenance stage, 49% in

the contemplation/preparation stage, and 18% in the pre-contemplation stage. The intervention group more often progressed through the stages than the control group (OR: 2.13, 95%CI: 1.33-3.42). After 6 months 52% of the intervention group was in the action/maintenance stage compared to 30% in the control group. No significant intervention effects were found on self-efficacy (for changing dietary as well as physical activity behaviour). For dietary behaviour the intervention had a significant positive effect on decisional balance for changing behaviour (OR: 1.95, 95%CI: 1.08-3.54). For physical activity this improvement was not significant by group assignment (OR: 1.45, 95%CI: 0.83-2.45).

Table 4. Baseline and follow-up descriptives, and intervention effects on stage-of-change, self-efficacy, and decisional balance.

	Physical activity				Dietary behaviour			
	Intervention (n=135)		Control (n=137)		Intervention (n=136)		Control (n=138)	
	T0	T1	T0	T1	T0	T1	T0	T1
Stage-of-change								
Action/maintenance (%)	35.2	51.1	29.1	29.9	53.2	75.0	51.0	47.8
Contemplation/preparation(%)	47.5	37.8	51.4	51.8	34.8	15.4	27.8	36.2
Pre-contemplation (%)	17.3	11.1	19.6	18.2	12.0	9.6	21.2	15.9
	OR (95%CI): 2.13 (1.33-3.42)		p-value 0.002		OR (95%CI): 3.18 (1.82-5.54)		p-value: <0.001	
Self-efficacy								
Very confident	23.1	33.6	28.8	24.3	20.5	26.9	24.0	25.2
Confident	42.9	43.3	43.5	43.4	46.2	53.7	42.7	45.2
Not sure	24.5	14.9	20.1	25.0	26.3	14.2	24.0	23.0
Not confident	9.5	8.2	7.8	7.4	7.0	5.2	9.3	6.6
	OR (95%CI): 1.41 (0.89-2.23)		p-value: 0.146		OR (95%CI): 1.53 (0.96-2.45)		p-value: 0.073	
Decisional balance								
More pros than cons	66.7	76.7	61.8	65.7	57.4	76.7	55.9	62.2
As many pros as cons	23.3	20.3	25.0	29.2	40.6	23.3	39.2	35.6
More cons than pros	10.1	3.0	13.2	5.1	1.9	0	4.9	2.2
	OR (95%CI): 1.45 (0.83-2.54)		p-value: 0.196		OR (95%CI): 1.95 (1.08-3.54)		p-value: 0.033	

T0 = baseline, T1 = follow-up at 6 months, OR = odds ratio, CI = confidence interval.

Adoption

The programme was developed and implemented in one large company. In the Netherlands, only a small percentage of all construction companies are large companies (>100 employees) [26]. At business unit level, representativeness was satisfactory. Participation rates did not differ

between the two main company units, general construction and infrastructure. However, within infrastructure participation rate varied between the subunits. The subunits that were under represented in participation were two specialised units involving road construction and earth moving.

Implementation

Programme level

Dose delivered: Of all planned coaching appointments 98.4% was provided by the PHC. One participant did not receive coaching at all, and for another participant one follow-up appointment was missed. The percentage of provided materials was 98.8%; two participants did not receive the VIP in construction toolbox.

Fidelity: The intended start of the coaching contacts was two weeks after the participants were included in the study. The first planned contact took place on average 5.7 (SD 3.6) weeks after randomisation. As a consequence three participants did not receive their last follow-up coaching contact before the short term follow-up measurements. Follow-up contacts were planned according to the protocol. However, if a scheduled appointment took place during a vacation period, in some cases the follow-up contact was postponed and the protocol was continued from that point in time. Based on the coaching registration in 6.3% (n=8) of the intakes, goal setting and formulating action plans were not adequately part of the intake session. During follow-up contacts in 98.2% barriers/successes and long term goals were addressed. The planned 30 minutes for intake C turned out to be insufficient for attending to all intake components; these contacts usually lasted longer than planned according to protocol. In addition to programme information on energy-balance related behaviour, the results of the exercise tests or cholesterol and blood pressure measurements proved useful starting points to motivate participants in goal setting. Not all PHCs prescribed the exercise card in all cases as stated by the protocol. One PHC indicated to have used the card only if participants explicitly mentioned musculoskeletal symptoms. Another PHC had the opinion that the exercises were too advanced for participants with obesity.

Table 5. Participation rate and mean number of attended coaching contacts for each coaching group (A,B,C).

	Number of contacts	Allocated	Perc. Non-adherence*	Mean number attended coaching appointments (n=150; allocated, incl. non-participants)	Mean number attended coaching appointments (n=126; those starting the coaching sessions)
A	4	40	30.0%	2.2 (1.7)	3.2 (1.0)
B	3	61	11.5%	2.3 (1.1)	2.5 (0.8)
C	2	49	10.2%	1.8 (0.8)	2.0 (0.4)
Total		150	16%		

*The percentage of study participants in the intervention group allocated to the coaching that did not participate in the coaching at all.

Individual level

Dose received (exposure): Of the 162 workers allocated to the intervention group, based on baseline BMI, waist circumference and amount of physical activity, 150 were eligible for coaching. Based on the coaching registration system, 84% (n=126) of the workers allocated to the PHC attended at least one coaching session. Main reasons for not participating were "not interested" or "no time", other reasons included health-related issues, and alleged privacy issues (e.g. employer aware of participation in health promotion programme). Table 5 shows participation and mean number of attended coaching contacts for each group. Participation rate differed between coaching groups. In group B (contemplation/preparation) and C (action/ maintenance) this was 11.5 and 10.2%, respectively. The most intensive group A (four sessions), which was the group pre-contemplators, had the highest non-response (30.0%).

Of the participants, 61.1% completed all coaching sessions. Main reasons given by the participants for not finishing the contacts were: lack of interest, time, or conflicting expectations of the programme. PHCs confirmed that in some cases during the intake it became apparent that participant's expectations differed from the actual programme content, such as receiving training guidance or treatment (physiotherapy) from the coaches. Questionnaires on participation and usage of the programme materials and satisfaction were completed by 121 workers at 6 months of follow-up. According to the interviewed PHCs the PEP forms were used in all intake sessions. However, from the questionnaire data it was concluded that only 26% of the participants used the forms further on during the intervention period. Practical materials were used more than informational materials: pedometer (52%), waist circumference measuring tape (43%), and BMI card (30%). The calorie card and cookbook were less used (15%). For the exercise card: 62% of participants indicated to have used the card at least once. However, only 13% used it regularly (once per week), and only 4% used the card as prescribed by the programme (three times per week).

Participants' attitudes: Overall, the mean rating of the programme was 7.6 (SD 1.0) on a scale from 0-10. By the participants who received at least one coaching appointment, the coaching was scored with 7.8 (sd 0.9). The majority of the participants was satisfied with the number of coaching contacts (86.5%), 2.1% perceived the number as too many, and 11.5% as too few. The mean rating of the programme materials was 7.2 (SD 1.1). Of all programme components (materials and coaching) the most appreciated component was the coaching contact.

Maintenance

The senior human resource manager was interviewed on intention of continuation of the programme after the trial phase. The intention of the organisational decision makers is to implement the programme provided that there is reasonable evidence that the programme will

produce long term benefits on sick leave or related health outcomes. Barriers for maintenance that were identified from the interview were related to organisational support and the current economic recession. As a consequence of the current economic situation in the construction sector, organisational issues such as financial resource allocation were prominent. Since resources to address worker health issues are limited, there has been a shift to decision making based on short term goals and effects. Lost work time due to participation in the programme might negatively influence support for the programme.
A possible facilitator for maintenance that was identified from the interview is that the company is currently changing its policy on work disability prevention, towards a more active role for the employer. As a result of this present organisational transition, follow-up of PHS, becomes integral part of the organisational policy. Within the new situation, the programme would become a more central (as opposed to peripheral) part of the organisation. This could positively contribute to organisational culture for sustainable implementation of the programme.

PHCs were interviewed on usability of the programme. Tailoring of the intensity of the coaching based on the stage-of-change questions was in most cases perceived as successful. However, in some cases, based on the intake, the coaches would have assigned the participant to a more or less intensive contact schedule. The first face-to-face contact was perceived as essential to build confidence between coach and participant. According to the coaches, for the follow-up contacts to be more effective, the first follow-up contacts should be planned shortly after the intake. Further, coaches encountered participants with emotional/psychological issues, such as stress or addiction, which probably should be addressed first before changes in lifestyle behaviour can be discussed. These issues might also be associated with unhealthy behaviour [27]; in the current protocol these issues were not addressed.

Discussion

The aim of this paper was to evaluate the process of the VIP in Construction intervention, using the RE-AIM framework. The external validity of this worksite health promotion trial was satisfactory with representative reach of workers and adoption of workplace units in the participating construction company. The intervention was effective on participants' progress through stages of behaviour change. The extent to which the programme was implemented as intended was modest. Satisfaction and dose delivered was high. However, adjustments to the programme should be made to improve exposure and fidelity. For the programme to be sustainably integrated into the health promotion practice of organisations, appropriate organisational context and information on health-related, work-related, as well as financial outcomes are essential.

The two RE-AIM dimensions reach and adoption, at different levels, refer to broadness and representativeness of the study sample [28]. Information on the reach of the programme is needed to gain insight in potentially selective participation and external validity. Participation rate in the VIP in Construction programme was 31% of the eligible workers. Participation in worksite health promotion programmes aimed at physical activity and nutrition levels are typically below 50% [29]. In general, blue collar workers appear less likely to participate in worksite health promotion programmes [28]. However, this programme was developed with input of this specific worker population, which was expected to improve participation rate. PHS was found to be a successful starting point for intervention. Worksites with small numbers of employees are less likely to provide health promotion programmes than larger companies, such as in the present study [30]. Linking programmes to PHS to increase reach might support health promotion in these settings as well.

When generalising the results from the specific setting of the RCT to the entire worker population, it should be taken into account that in the study population older workers were slightly over represented. Older workers being more likely to participate, is in line with other trials [31,32]. Some reports find that participants that actively engage in health programmes are those that already have a healthier lifestyle and therefore are more motivated to participate [33,34]. Lack of participation by high-risk employees has been cited as a barrier to adopt WHP programmes [30]. In this programme, based on PHS data of the company, the programme has reached a representative sample regarding levels of BMI.

Contextual factors could have played a role in the adoption of the programme. First, during the recruitment period of the study, the economic crisis started to have a negative effect on the construction sector resulting in termination of employment, and workers reporting increased work pressure and job insecurity. Second, the company units that were under represented are, more than other units, characterised by shift work, irregular work hours, and temporary worksites. These characteristics might be barriers for adoption of the programme. Another explanation is that management engagement influenced participation in the programme. In another worksite intervention for construction workers it was found that organisational support was an important factor for participation [35]. In the present study the role of direct supervisors was larger than anticipated in the development of the programme. Appointments (follow-up measurements as well as coaching contacts) for workers in these units were usually made through their supervisors, and as a consequence of increased time and financial pressure the programme might not have had highest priority. Conflicts of work demands have increasingly been found a barrier to offering worksite health promotion programmes [30]. Although top management support was excellent (during the development and continuously during the trial phase), for these units facilitation of participation by supervisors during work hours is probably also essential and could increase

enrolment. Regarding the representativeness of the setting it should be mentioned that recruiting construction companies for another health promotion intervention was found to be difficult, and company size was found to influence process outcomes [35]. Smaller construction companies might have other factors or decision making processes that are relevant for adoption of health promotion programmes.

Tailoring by motivational stage can be used to predetermine readiness for behaviour change in energy-related behaviour, which potentially enables addressing low completion rates in health promotion programmes and its related cost issues [36]. In contrast to another worksite individual counselling study [37] the programme was able to reach a substantial group of pre-contemplators. Regarding physical activity 26% of the Dutch adult population is considered to be pre-contemplator [38], for dietary change this is approximately 50% [39]. Of the group pre-contemplators included in the study, two third actually started the coaching programme. To increase this rate, a stage-based adjustment of the programme preceding the coaching contacts might be advisable to increase exposure to the programme and motivate workers to the next stage.

Furthermore, it has been suggested that tailored interventions may be more effective to induce behaviour changes [21], and stage progression could be a good indicator of the effectiveness of stage-of-change based tailoring as a basis for intervention. Regardless of an already substantial percentage of workers in the action/maintenance stage at baseline, the intervention helped a significantly greater number of workers in the intervention group to progress through the stages of change than did in the control group. Stage movement is a proxy measure of behavioural change, and does not necessarily result in actual behaviour change [21]. However, since a substantial group moved to the action/maintenance stage, the progression could be regarded as intervention effectiveness.

At programme level, implementation was defined by dose delivered and fidelity. Dose delivered was satisfactory, but fidelity was moderate. By pilot testing the coaching schedules, some of the practical issues could have been prevented. At individual level dose received and satisfaction were assessed. Satisfaction with the programme and PHCs was high. The majority of participants reported to be satisfied with the number of coaching contacts. Although the intake contacts were organised at the worksite and also the follow-up coaching sessions could be completed in company time, which potentially increases adherence [40], the number of actually received contacts was suboptimal, since 38% of the participants in the coaching sessions did not fully finish the programme. Thus, although in a previous weight loss intervention an association was found between number of contacts and intervention effectiveness on weight loss [41], for this population, increasing number of contacts might be hardly feasible. Practical tools for

self-monitoring were used more often than paper materials. Since the use of self-monitoring in behavior change has both theoretical foundation and significant association with weight loss [42], successful use of these materials might induce actual change in programme outcomes. Implementation of the exercise component was not successful. This could in part be a result of the PHCs not always prescribing the exercises.

For a worksite health promotion programme to be implemented and remain viable in the long term, organisational support and institutionalisation are important factors [43]. First, to decide whether or not to provide worksite health promotion interventions to their employees, employers need information about the trade-off between costs and effects. Economic evaluation of the program from the company's perspective, especially when resources are limited, would provide essential input for making a business case to obtain senior management support. Further, even if there are no financial limitations for implementation, feasibility of long term implementation of the programme requires appropriate organisational infrastructure and capacity. For the programme maintenance after the trial phase, the role of the researcher/research assistant should be easily transferable to agents in the company. The coaching was delivered by external professionals, who could continue after the trial phase. However, planning and organisation was almost entirely done by the study staff. This was time- consuming and it decreases the influence on company maintenance after the trial phase. Therefore, it is recommended that sustainability, for example by appointing key persons within the company to integrate the programme, becomes part of the design of such programmes.

Strengths and limitations

The first strength was that in this process evaluation study compliance with the programme was obtained by objective measures. The coaching attendance was registered for each appointment, as well as reasons for not attending. Secondly, process measures were evaluated at different levels. Data were collected from organisational decision makers, participants in the study, as well as intervention deliverers (PHCs).

A limitation of this evaluation is that supervisory staff was not involved. Their role was larger than anticipated, and input and support from this particular management level could improve adoption and implementation. Another limitation of this study was that the fidelity concept was partly measured by self-report, instead of fully by objective measurement. To objectively measure the content of coaching appointments, audio recording and analysing the actual conversations would give a more reliable representation of the actual implementation process. Finally, the concepts of the TTM (stage-of-change, self-efficacy, and decisional balance) were measured using single-item questions. Preferably these constructs are measured with more extensive multi-item questions (or algorithms) since physical activity as well as dietary behaviour are complex behaviours. For

tailoring in a large-scale intervention this would be unpractical. However, this would be a more suitable and valid approach when tailoring is applied in the individual counselling setting.

Conclusions

Based on the reach dimension, the external validity of the study is satisfactory, with a representative study population. Based on the RE-AIM dimensions implementation and effectiveness, it is concluded that for construction workers the programme is feasible. In addition, the programme is potentially effective based on the intervention effect on movement through the motivational stages-of-change for PA as well as dietary behaviour. However, some adjustments to improve exposure and fidelity should be made. A contextual factor of importance in the process of conducting the programme was the current economic climate in general and specifically in the Dutch building and construction industry. This had consequences for adoption, and could have consequences for the future implementation and maintenance of the programme as well.

This evaluation provides insights for researchers and practitioners planning and implementing intervention programmes in a workplace setting. In addition, it may help employers to make informed decisions about worksite health programme adoption and implementation.

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