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Chapter 5

Improvements in dietary and physical activity behaviours and body mass index as a result of a worksite intervention in construction workers: results of a randomised controlled trial

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(submitted)

Abstract

Purpose: To evaluate the effectiveness of an individually tailored intervention for improvement of lifestyle behaviour and prevention and reduction of overweight disorders among construction workers.

Design: Randomised controlled trial.

Setting: Construction industry

Subjects: Blue collar workers, randomised to an intervention (n=162) or control group (n = 152).

Intervention: The intervention group received individual coaching sessions, tailored information and tailored materials to improve lifestyle behavior, the control group received usual care.

Measures: Body weight, body mass index (BMI), waist circumference, physical activity levels (PA), dietary behaviour, blood pressure, and blood cholesterol were assessed.

Analysis: Linear and logistic regression analyses were applied, with outcome measures at 6- and 12-month follow-up as dependent variables, adjusting for their baseline levels.

Results: After 6 months a statistically significant intervention effect was found on body weight (B -1.06, p=0.010), BMI (B -0.32, p=0.010), and waist circumference (B -1.38, p=0.032). At 6 months vigorous PA increased significantly in the intervention group compared to the control group (B 2.06, p=0.032), and for sugar-sweetened beverages (SSB) an intervention effect was found at 6 months as well (B -2.82, p=0.003). At 12 months, for weight related outcomes, these differences were still present, however slightly smaller and no longer statistically significant.

Conclusion: Intervention participants showed positive changes in vigorous PA and dietary behavior compared to controls, as well as effects on weight-related outcomes at 6 months. Long-term effects were still promising, but no longer statistically significant.

Introduction

The worldwide increased prevalence of overweight and obesity is associated with considerable health concern. Excess body weight is associated with increased mortality [1] and adverse health outcomes [2]. The predominant health issues associated with overweight and obesity include type 2 diabetes, cardiovascular disease (CVD), cancer, and musculoskeletal disorders (MSD) [3,4]. The economic burden of overweight is substantial and is expected to increase [5]. In the Netherlands annual overweight related health care costs are estimated at €500 million, while indirect costs, reflecting the value of lost productivity resulting from work absence and disability, are projected to be about €2 billion [6,7].

In general, even after adjustment for socio-demographic factors, the prevalence of overweight and obesity in construction workers is higher than in the general adult population [8-10]. Although in white collar workers with a more sedentary daily routine the overweight issue has also been described, in blue collar (construction) workers the overweight problem is of specific concern. Blue collar workers in the construction industry have an increased risk for sick leave, disability, and decreased productivity as a result of (a combination of) obesity, a high physical workload [11], and musculoskeletal symptoms [12-14]. In addition, due to the physically demanding nature of construction work, we hypothesised that overweight and obesity in this specific group also have more individual and larger economic consequences.

This increased prevalence of overweight justifies occupational and sector specific preventive strategies [6] for construction workers. Preventing and reducing excessive body weight among workers with a high physical work demand, might be a strategy to increase or preserve work ability [12], decrease sick leave [11] and musculoskeletal symptoms by lowering the relative load on the musculoskeletal system.

In several systematic reviews and a recent meta-analysis evidence was found for effectiveness of worksite physical activity and dietary behaviour interventions on weight outcomes [15,16]. These did not include effective interventions specifically designed for blue collar workers in the construction industry. A lifestyle programme aimed at improving health of construction workers with a high risk for CVD showed promising effects of lifestyle counselling on weight related outcomes [17]. However, this programme aimed at a high risk group, while it could be argued that for prevention in a population with a relatively high prevalence of unhealthy weight, a population approach might be the most appropriate strategy. The World Health Organisation (WHO) has recommended that prevention of overweight and obesity should target adults even while body mass index (BMI) is still within an acceptable range [18].

The aim of the present study was to evaluate the effectiveness of an individually tailored intervention, 'VIP in construction', among blue collar construction workers on body weight-related measures (i.e. body weight, BMI, and waist circumference), blood pressure, and cholesterol. In addition, to gain insight into which behavioural changes may have led to the effects on these outcomes, physical activity and dietary intake were evaluated.

Methods

Trial design

The effectiveness of the programme was measured by performing a randomised controlled trial (RCT). Participants were measured at baseline (T0), at 6 months (T1), and at 12 months (T2). Written informed consent was obtained from participants before enrolment in the study. Consenting participants were randomised to the intervention or control group after the baseline measurement. The control group received care as usual and was only contacted for the baseline and follow-up measurements. The study design and procedures have been approved by the Medical Ethics Committee of the VU University Medical Center, and the trial has been registered in the Netherlands Trial Register (NTR): NTR2095.

Participants

The research population consisted of consenting blue collar workers of a construction company who attended a non-compulsory periodic health screening (PHS). The exclusion criterion was being on sick leave > 4 weeks at baseline. In total 314 workers were recruited over a 15-month period (March 2010 to June 2011), and randomised to an intervention (n=162) or control group (n = 152).

Randomisation and blinding

After baseline measurements the participants were randomly assigned to either the intervention or the control group by a computer generated list using SPSS (version 15). The randomisation was prepared and performed by an independent researcher (i.e. the research assistant). After randomisation, workers assigned to the control group received general information on the follow-up measurements. Intervention providers could not be blinded for allocation; however, they were not involved in the outcome assessment.

Intervention

The intervention programme aimed at the prevention and reduction of overweight and MSD, and was developed and implemented by applying the Intervention Mapping protocol [19,20]. The programme was offered at the worksite during working hours. The intervention commenced preferably within two weeks after the baseline measurements delivered by study-trained

health professionals (personal health coaches, PHC) during face-to-face and telephone health coaching sessions. Participants also received personal energy plan (PEP) forms to record their goals and action plans, and which they could use during the follow-up health coaching sessions. The intervention was tailored to the participant's weight status (BMI and waist circumference), physical activity level, and stage-of-change. The intervention programme focussed on improving (vigorous) physical activity levels and healthy dietary behaviour, and in addition to the coaching sessions consisted of tailored information, training instruction (a fitness "card" to be used for core stability and strengthening exercises), and the 'VIP in construction toolbox' (overview of the company health promoting facilities, waist circumference measuring tape, pedometer, BMI card, calorie guide, recipes, and knowledge test).

Outcome measures

Questionnaire and physiological measurement data were collected from 2009 until 2012, at baseline before the randomisation (n=314), 6 months after baseline, following the intervention (n=277), and 12 months follow-up after baseline (n=261). The periodical health screening provided baseline data and was performed by the occupational physician (OP) or assistant. Participants filled in an additional study questionnaire. Follow-up measurements at 6 and 12 months were performed by study trained research assistants. To ensure standardisation of measurements OPs and assistants were provided with measurement protocols.

Body weight and BMI: Body weight was measured using a digital weight scale. Body weight and height were measured with the participants standing without shoes and heavy outer garments. Data on body weight and height were used to calculate BMI (kg/m²).

Waist circumference: Waist circumference was measured as midway between the lower rib margin and the iliac crest with participants in standing position at the end of expiration [21]. To standardise waist circumference measurement, OPs and assistants were provided with a Seca 201 waist circumference measure (Seca, Hamburg, Germany).

Blood pressure: At follow-up systolic and diastolic blood pressure (mmHg) was measured twice with a fully automated blood pressure monitor (type: OMRON M6). The mean value of the two measurements was computed.

Blood cholesterol (total cholesterol, TC): TC (mmol/l) was measured with non-fasting finger stick samples analysed on a Cholestech LDX desktop analyser (Cholestech, Hayward, USA). This analyser has been validated for lipid measurements in clinical practice [22].

Energy balance-related behaviour

Physical activity: In the study questionnaire the validated Short Questionnaire to Assess Health enhancing physical activity (SQUASH) was applied [23]. The SQUASH measures duration, frequency and intensity of different domains of physical activity (active work transportation, occupational physical activity, household activities, and leisure time activities). For the leisure time

domain, activities were subdivided into age dependent intensity categories, by the metabolic equivalents (METs) derived from the compendium of physical activities [24]. Since the VIP in Construction intervention was aimed at improving leisure time moderate and vigorous physical activities (MVPA), the outcome measure for this study was total minutes per week for moderate to vigorous activities in leisure time including sports activities, walking, cycling, doing odd jobs, and gardening. Additionally, the frequency of vigorous activities was obtained from the PHS questionnaire as assessed by the number of days per week vigorous intensity leisure time activities that are performed at least 20 minutes. These questions relate to international physical activity guidelines [25] as well as to the Dutch guidelines [26].

Dietary intake: Alcohol consumption was obtained from the PHS questionnaire asking participants to report their average consumption (in glasses per week). Portion size at dinner, number of beverages, as well as consumption of energy dense snacks, fruit and vegetables were assessed using questions that were also used in the Health under Construction study [27]. In these questions average weekly intake and daily portions of several food groups during a usual week during the past month are indicated.

Potential confounders and effect modifiers

Data on potential confounders and effect modifiers were assessed by questionnaire including age, smoking (yes/no), education (low=elementary school, medium=secondary education, and high=college/university), and marital status (married/ cohabitating, single/ divorced/ widowed).

Sample size

The sample size calculation has been described elsewhere [19]. In each study group (intervention and control) 130 participants were needed at follow-up.

Statistical methods

Randomisation was checked for differences in baseline values between the intervention and control group, using independent t-test for continuous variables and Pearson's Chi-square tests for categorical and dichotomous variables. Regression models were presented as crude (model I) and adjusted full models (model II).

The effectiveness of the lifestyle intervention was assessed using a regression analysis with the outcome measures at 6 months and 12 months follow-up as the dependent variables and adjusting for the baseline levels of the outcome measure. Both crude and adjusted analyses were performed. Linear and logistic regression analyses were performed using SPSS 20.0 (SPSS Inc. Chicago, Illinois, USA). According to the intention-to-treat principle, all available data of the participants, regardless of whether or not they actually received the complete intervention, were used for data analysis. The analysis was conducted with all available data of the respondents at the time of follow-up. For all analyses, a two-tailed significance level of <0.05 was considered statistically significant.

Results

Between March 2010 and June 2011, 314 participants were enrolled in the study. Figure 1 presents the CONSORT flow chart of the participants throughout the trial. A total of 162 workers were assigned to the intervention group and 152 to the control group; 83% of the workers remained in the study during the 12-month follow-up.

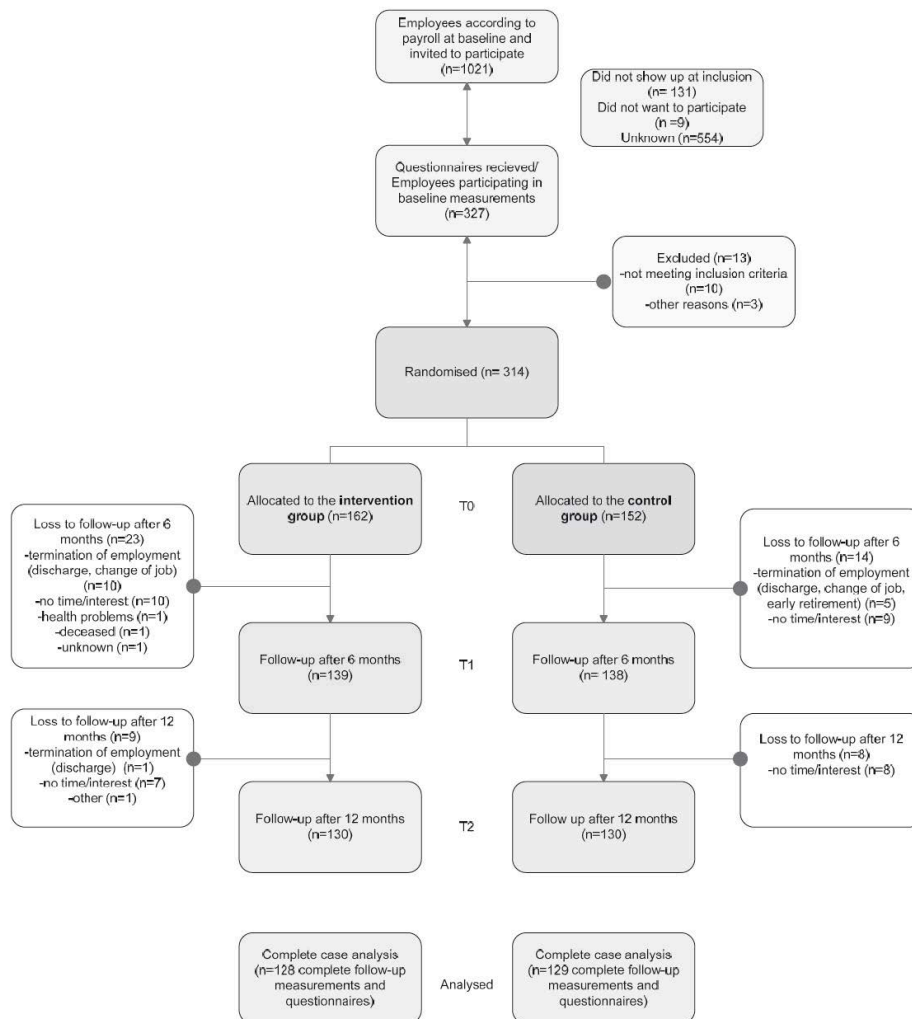


Figure 1. Flow chart of the study participants

Baseline and confounding

Baseline characteristics of the two study groups are presented in table 1. All participants were male. Of the total study population 70% was overweight, and 22.7% obese. No statistically significant baseline differences between the intervention or control group were found for outcome measures or potential confounders.

Table 1. Baseline characteristics of the total study population and by group allocation.

	All	Intervention	Control
Number of participants	N= 314	N= 162	N= 152
Age, mean (SD)	46.6 (9.7)	46.3 (9.9)	47.0 (9.5)
Weight, kg (SD)	88.8 (13.6)	88.7 (12.9)	88.9 (14.4)
BMI (kg/m ²)	27.4 (3.7)	27.3 (3.5)	27.4 (3.9)
Normal (<25) (%)	30.0	29.2	30.9
Overweight (25-29.9) (%)	47.3	50.9	43.4
Obese (>30) (%)	22.7	19.9	25.7
Waist circumference (SD)	99.4 (11.0)	99.1 (10.2)	100.0 (11.8)
Systolic BP, mmHg (SD)	131.1 (14.6)	131.1 (15.4)	131.1 (13.7)
Diastolic BP, mmHg (SD)	82.8 (9.7)	82.0 (10.4)	83.6 (8.9)
Blood cholesterol, mmol/l (SD)	5.4 (1.0)	5.3 (1.0)	5.4 (1.1)
Smoking (Yes, %)	29.4	29.0	29.7

Physiological outcomes

Table 2 presents the means (SD) for body weight, BMI and waist circumference at baseline, 6 and 12 months follow-up for the intervention and control group, as well as the results of the linear regression analysis. At 6 months, there was a significant intervention effect on body weight (B -1.06, 95%CI: -1.87;-1.26), BMI (B -0.32, 95%CI: -0.57; -0.08), and waist circumference (B -1.38, 95%CI: -2.63; -0.12) (table 2). Directly following the intervention period, body weight and BMI increased in the control group, while it did not change significantly in the intervention group. Waist circumference decreased for the intervention participants. At 12 months, analyses within groups (paired t-tests) showed that the decrease in waist circumference in the intervention group and the increase in body weight and BMI in the control group compared to baseline values were still significant. However, the effects for body weight and BMI in the between group analyses were only marginally significant (p=0.053 and p=0.057, respectively) and even further from statistically significant for waist circumference (p=0.187).

No significant intervention effects in diastolic or systolic BP or total cholesterol levels were found (table 3).

Table 2. Data on primary outcome measures for complete cases at baseline (mean, SD) at 6 and 12 months follow-up in the intervention and control group.

Outcome measure	Intervention Mean (SD)	Control Mean (SD)	Model I		Model II	
			B(95% CI)	p-value	B(95% CI)	p-value
Weight, kg						
N	127	129				
Baseline	88.3 (12.3)	89.1 (15.1)				
6 months	88.7 (12.1)	90.3 (15.1)	-0.92 (-1.69 ; -0.14)	0.021	-1.06 (-1.87 ; -0.26)	0.010
12 months	88.7 (12.4)	90.2 (15.2)	-0.81 (-1.80 ; 0.18)	0.110	-1.00 (-2.01 ; 0.01)	0.053
Body mass index, kg/m ²						
N	127	129				
Baseline	27.3 (3.5)	27.5 (4.0)				
6 months	27.5 (3.3)	27.9 (4.0)	-0.29 (-0.52 ; -0.05)	0.017	-0.32 (-0.57 ; -0.08)	0.010
12 months	27.5 (3.5)	27.9 (4.0)	-0.25 (-0.55 ; 0.05)	0.107	-0.30 (-0.61 ; 0.01)	0.057
Waist Circumference, cm						
N	119	114				
Baseline	99.2 (10.0)	100.3 (12.3)				
6 months	97.6 (9.7)	100.0 (11.8)	-1.38 (-2.58 ; -0.18)	0.024	-1.38 (-2.63 ; -0.12)	0.032
12 months	97.9 (9.7)	99.9 (11.8)	-0.95 (-2.23 ; 0.32)	0.142	-0.91 (-2.25 ; 0.44)	0.187

B-values reflect absolute differences between groups corrected for baseline values of the measures.

Model I = crude model, adjusted for baseline values

Model II = adjusted model for baseline values, age (continuous), education (categorical), marital status (dichotomous), and smoking (dichotomous)

Table 3. Baseline data and estimated effects of the intervention on blood pressure (BP) and cholesterol.

Outcome measure	Model I			Model II		
	Intervention Mean (SD)	Control Mean (SD)	B(95% CI)	p-value	B(95% CI)	p-value
Systolic BP, mmHg						
N	128	129				
Baseline	131.0 (15.8)	131.5 (14.4)				
6 months	134.5 (14.8)	135.3 (14.6)	-0.50 (-3.90 ; 2.90)	0.770	-1.12 (-4.63; 2.40)	0.532
12 months	133.9 (18.4)	133.7 (13.3)	0.50 (-3.07; 4.07)	0.783	0.16 (-3.49; 3.81)	0.932
Diastolic BP, mmHg						
N	128	129				
Baseline	82.5 (10.3)	83.6 (9.1)				
6 months	82.1 (10.7)	82.7 (9.6)	-0.05 (-2.34 ; 2.24)	0.967	0.25 (-2.10; 2.61)	0.832
12 months	82.3 (12.1)	80.9 (9.5)	2.02 (-0.41; 4.45)	0.102	2.22 (-0.28; 4.71)	0.081
Blood cholesterol (TC), mmol/l						
N	116	115				
Baseline	5.3 (1.0)	5.3 (1.0)				
6 months	5.0 (1.0)	4.9 (0.8)	0.03 (-0.15 ; 0.21)	0.725	0.05 (-0.13; 0.23)	0.583
12 months	4.8 (0.9)	4.7 (0.8)	0.07 (-0.10; 0.24)	0.404	0.07 (-0.11; 0.25)	0.424

B-values reflect absolute differences between groups corrected for baseline values of the measures.

Model I = crude model, adjusted for baseline values

Model II = adjusted model for baseline values, age (continuous), education(categorical), marital status(dichotomous), and smoking (dichotomous)

Physical activity

No intervention effects were found from complete cases analysis on leisure-time MVPA (table 4). At 6 months intervention group participants increased their leisure time MVPA, but no significant intervention effect was found (B 70.6, 95%CI: -23.3; 165.5). At 6 months after baseline there was a significant intervention effect on meeting the public health guideline of vigorous physical activity (OR 2.06 95%CI: 1.07 ; 3.99). Participants in the intervention group meeting the guideline increased with 8%. After 12 months there was no significant difference between the intervention and the control group.

Dietary intake

A statistically significant intervention effect on intake of sugar-sweetened beverages was found after 6 months (table 4). Participants in the intervention group decreased their intake with one glass per week, while control group participants increased their intake (B -2.82, 95%CI: -4.67; -0.97). At 12 months after baseline no effect was found on SSB (B -0.96, 95%CI: -2.68; 0.63). No significant short-term or long-term intervention effects were found for any of the other dietary outcome measures.

N	124	126						
Baseline	10.6 (7.3)	11.6 (8.4)						
6 months	11.3 (7.0)	10.7 (8.5)	1.15 (-0.32 ; 2.62)	0.125	1.19 (-0.34 ; 2.62)	0.101		
12 months	11.5 (7.4)	11.9 (8.3)	0.19 (-1.46 ; 1.83)	0.824	0.25 (-1.44 ; 1.94)	0.769		
Vegetables (spoons [†] /week)								
N	125	126						
Baseline	12.3 (8.0)	12.4 (7.6)						
6 months	12.1 (6.9)	11.1 (6.8)	0.96 (-0.61 ; 2.52)	0.229	1.12 (-0.48 ; 2.72)	0.168		
12 months	11.9 (7.2)	11.5 (8.5)	0.44 (-1.41 ; 2.29)	0.639	0.62 (-1.19 ; 2.43)	0.498		

B: unstandardised regression coefficient, OR: odds ratio, MVPA: moderate to vigorous physical activity, VPA: vigorous physical activity, SSBs: sugar-sweetened beverages

Model I = crude model, adjusted for baseline values

Model II = adjusted model for baseline values, age (continuous), education(categorical), marital status(dichotomous), and smoking (dichotomous)

The numbers in the table represent values for B, numbers marked with ‘’ represent odds ratios

† glasses = standard drink containing approximately 10 grams of alcohol

#spoon = 50 grams

Discussion

Overall, the VIP in construction intervention positively impacted diet and physical activity, and resulted in short-term favourable body weight related outcomes when compared to usual care. After the intervention period, intervention participants showed significantly more positive changes in physical activity and dietary behaviour. These effects did not translate into weight loss. While changes in mean body weight and BMI were negligible across the intervention period for the intervention group, the control group participants gained weight at 6 months, which resulted in an intervention effect on body weight and BMI. Furthermore, the intervention group participants showed a decrease in waist circumference which resulted in a significant intervention effect on waist circumference at 6 months as well. At 12 months follow-up, differences were still present, however slightly smaller and no longer statistically significant.

Weight-related outcomes

From the perspective of many worksite health promotion programmes, and the overall trend in increasing body weight in the present study, preventing weight gain may be a positive and realistic outcome. The net body weight effects are modest compared to other worksite interventions ranging from -1.2 to -1.3kg and -0.3 to 0.5 kg/m² for BMI [15,28]. An explanation for these modest results might be that participation in this worksite health promotion trial was not restricted to a high risk group only (employees were not pre-selected on high body weight). The present study started with participants that as a group at baseline were overweight, but not obese (mean BMI < 28). In contrast, in weight loss interventions where participants are obese or who otherwise present a specific risk profile, weight loss results are likely to be larger than those obtained from a general worker population. Therefore, the weight loss results are not directly comparable to the overall weight loss literature or to most studies conducted in other clinical settings. Still, the lack of more impressive weight loss results in this study raises questions about the relevance of the effects. Clinically relevant weight loss is associated with an improvement in the clinical risk of adverse health problems [29]. Although often weight loss of 5% has been indicated as clinically relevant, even smaller reductions in weight have been shown to result in clinically meaningful reductions in important CVD risk factors and on risk of diabetes [30,31]. This indicates that very small reductions in body weight could be considered relevant.

The goal of the intervention was to improve lifestyle behaviours that would be easy to implement and could be maintained over time. These type of interventions can be incorporated in or linked to routine health screening, which potentially increases reach as well as the likelihood of implementation. It is important to address that the intervention was not designed to maximise short-term weight loss. The lack of overall weight loss in the intervention group could be attributable to intervention intensity. In other studies where weight loss has been a primary outcome, more intensive approaches have typically been more effective than those with less

contact [32,33]. However, such intensive approaches have a number of limitations. Applying high intensity programmes leads to more expenses and these are likely to appeal to only a small percentage of those who would benefit because of the level of commitment required. In the present study, even though the coaching sessions mostly took place during working hours and at the workplace, some participants indicated lack of time as a reason not to participate or did not complete all contacts.

It has been suggested that waist circumference is more sensitive to changes in energy balance than is BMI [34-36]. In the present study, the overall effect on waist circumference was not accompanied by reduction in body weight. Although reductions in central obesity are larger when accompanied by weight loss, increases in physical activity have been associated with significant reductions in waist circumference, despite small or no changes in body weight [37]. BMI reflects lean tissues as well as body fat. Physical activity provides metabolic adaptations that are associated with reductions in abdominal fat and increases in fat free (skeletal muscle mass) as well as metabolic efficiency of muscle. Since a substantial percentage of the study participants had baseline waist circumferences that represent health risk ($>102\text{cm}$), the effect on waist circumference is considered relevant also when considering the association with MSD and central obesity [38].

Energy balance-related behaviour

Both changes in physical activity and diet could have contributed to the effects on weight related outcomes. The intervention showed a positive effect on meeting the public guidelines for vigorous physical activity. However, no intervention effects were found for leisure time MVPA. This is in line with the study of Groeneveld et al. [39], who suggested that lack of effect may be related to average high levels of baseline PA at work for construction workers. Furthermore, the SQUASH questionnaire was not designed to measure energy expenditure and changes over time, but to give an indication of habitual PA level [23]. It has been suggested that high intensity activity measures might be more reliable, presumably because these activities are easier to recall. As a result, responsiveness in measures of more intensive levels of PA could be higher. The intervention effect on decreased intake of sugar-sweetened beverages (SSBs) could have contributed to the effect on weight-related outcomes. Intakes of SSBs have been found to significantly contribute to increased caloric intake and higher body weight [40,41].

Although short-term post intervention effects were found, comparable to other weight loss or weight gain prevention studies [42,43], maintaining health behaviour changes and effects on weight-related measures remains difficult. In general, this might be a result of relapse (not maintaining behaviour change) in the intervention participants. A decrease in between-group differences could also be the result of changes in favour of the control group participants. In the present study, at 12-month follow-up, participants in the control group showed slight improvement in several behavioural outcomes. The measurements conducted for the evaluation of the study

effectiveness itself may have motivated control participants to improve health-related behaviour. In addition, contamination between the intervention group participants and the controls could not be completely ruled out. Contamination of the control group was expected to be minimal, since personal coaching was only available for the intervention participants. However, behaviour change in colleagues, especially dietary behaviour at work could have influenced control participants. This could partly explain the decreased contrast in outcome measures between the two groups at 12 months follow-up.

Strengths and limitations

A strength of the present study is that it was conducted as a randomised controlled trial. Randomisation was performed at the level of the individual, which reduces the probability of confounding factors through baseline differences between intervention and control participants. Another strength was that the intervention was tailored to the individual worker, which might be especially important in a heterogeneous group of workers (e.g. ranging from crane drivers to bricklayers) and when intervening on complex behaviours.

Several methodological limitations deserve attention as well. Diet and physical activity were measured by self-report. The original study design comprised additional accelerometer measurements. In the present trial, this appeared not feasible; insufficient complete data samples were gathered suitable for analysis. Further, social desirability may have resulted in an overestimation of fruit and vegetable intake, and underestimation of snack, alcohol, and sugar-sweetened beverages intake, particularly in intervention group participants [44]. Accurate assessment of actual behaviour without imposing a large burden on respondents (especially in occupational groups where illiteracy is present) remains challenging.

Implications for future research

It is clear that (sustained) change to energy balance-related behaviour will result in effects on body weight. It is recommended that further worksite health promotion research aims at identifying methods to achieve long-term sustainable impact. Lifestyle interventions aimed at weight loss achieve short-term success, but body weight re-gain is common. To prevent weight regain for those who lost weight, specific strategies are required to maintain specific weight loss goals. These strategies to maintain weight loss may also play an important role in preventing weight gain among normal-weight individuals. However, there is still little evidence from trials what might be effective long-term strategies. From observational studies it is suggested that, for example, continued intervention contacts (face-to-face or by e-mail) [45] or continued self-monitoring of weight [46] lead to sustained effects on body weight related outcomes. Complementary intervention components at company level, for example strategies to enhance social support by colleagues and supervisors, might also reinforce sustained effects [47].

Implications for practice

The intervention programme appeared feasible for blue collar workers with a relatively low intensive intervention and promising short term effects. The programme needs to be adapted to improve long term effectiveness, before implementation or broader implementation in other settings can be recommended.

Conclusions

The results of this study indicate that a relatively low-intensive worksite intervention has the potential to improve dietary and physical activity behaviour in blue collar construction workers, and to contribute to the prevention of body weight gain. Further research is needed to improve long-term effectiveness, and insight into effectiveness might be increased if more objective measures of physical activity and diet are used.

So What? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic

In the literature evidence is found for effectiveness of worksite physical activity and dietary behaviour interventions on weight outcomes. The prevalence of overweight and obesity in blue collar construction workers is higher than in the general adult population, however no effective weight management programmes have been found targeted at this specific occupational group.

What does this article add?

The effectiveness of a newly developed targeted and tailored intervention is assessed in a randomised controlled trial. The relatively low intensive lifestyle intervention appeared feasible for blue collar workers with promising short-term effects.

What are the implications for health promotion practice or research?

Before implementation can be recommended, the programme needs to be adapted to improve long-term effectiveness. It is recommended that for successful weight management further worksite health promotion research aims at identifying methods to achieve long-term sustainable impact.

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