

## Chapter 4

### **Process evaluation of an occupational health guideline aimed at preventing weight gain among employees**



Lisanne M Verweij

Karin I Proper

Carel T J Hulshof

Willem van Mechelen

*J Occup Environ Med* 2011;53(7):722

## **Abstract**

**Objective** To evaluate the process of an occupational health guideline aimed at preventing weight gain.

**Methods** Quantitative data on seven process items were assessed, and linked to effects on employees' waist circumference and body weight at 6-months.

**Results** Occupational physicians (n=7) implemented the guideline partly with respect to the environmental level, but performed well at the individual level. Behavioral change counseling was performed 'to some extent'. Employees (n=274) showed high reach (86%), satisfaction (7.1) and attendance rates (4.4 of out 5 sessions). Significant effects were found on waist circumference (-1.5 cm to -2.1 cm) and body weight (-0.9 kg to -1.4 kg) among employees with higher attendance and satisfaction rates.

**Conclusions** Workplace health promotion via an occupational health guideline is feasible, but the environmental component and behavioral change counseling need revisions before practical application.

## Background

Occupational health services research has become considerably more important over the past years, due to the demand for effectiveness of care, the need for costs management and the development of guidelines aimed at health promotion [1]. Research on the effectiveness of guidelines shows that they often do improve clinical practice, but the impact of practice guidelines on quality of care is often hampered by factors such as low compliance rates and a lack of dissemination and implementation strategies [2]. Understanding what happens during an intervention and how that has affected program impact is therefore an increasingly important part of occupational health services research [1,3].

In the Balance@Work project, the effectiveness of a draft occupational health guideline aimed at preventing weight gain among employees is evaluated in a randomized controlled trial [4]. As overweight and especially obesity are related to high morbidity, mortality and healthcare costs [5-7], preventing weight gain through the promotion of physical activity and healthy dietary behavior is important for achieving and maintaining a good health throughout life [8]. The guideline consists of an environmental component for which occupational physicians (OPs) provide advice to employers on how to assess and intervene on the obesogenic work environment, and an individual component describing how OPs can promote physical activity and healthy dietary behavior of employees, during five counseling sessions within six months. As a third element in the guideline, evaluation and maintenance by OPs of previously mentioned components was imposed.

Following the consolidated standards of reporting trials (CONSORT), this process evaluation reports in detail how the intervention was administered [9]. Although outcome evaluation has the most impact on decision making of new health policy, a lack of effect may have been due to the fact that the program was not implemented as intended (type III error) [10]. A process evaluation can thus clarify if flaws are due to the content or performance of the guideline, and may provide recommendations for improvements for occupational health practice [11,12]. Process evaluation is especially necessary in multifaceted and multisite trials, where the intervention may be implemented and received in different ways [13]. Moreover, because effects of preventive interventions on outcome measures such as waist circumference and body weight may be small, process data may in some cases provide more sensitive measures of quality than outcome data [14]. Therefore, the aim of this study was to evaluate important process parameters of the Balance@Work intervention.

## Methods

The process evaluation was carried out as a part of the Balance@Work project. The study protocol was approved by the Ethics Committee of the VU University Medical Center and all participants signed informed consent. Details of the study design have been published elsewhere [4].

### **Participants**

OPs providing services to one or more companies of medium or large size (> 100 workers) were eligible to participate. OPs willing to participate were randomized to the intervention or control condition by an independent researcher with a computer generated list (n=28). Next, OPs were asked to recruit at least 30 employees, via their usual channels (such as written letters, intranet, or consultations). Employees with unhealthy physical activity and/or dietary behavior, or who were overweight according to (inter)national guidelines [15-17] were eligible to participate. Employees were excluded when pregnant, in case a disease or condition was present which made physical activity impossible, if sickness absence lasted for 21 days or longer, or if they were unable to complete a Dutch questionnaire.

### **The Balance@Work intervention**

The draft occupational health guideline was developed according to the protocol of the Netherlands Society of Occupational Medicine and the Intervention Mapping protocol [18,19]. Based on literature, interviews with relevant stakeholders and consensus among an expert group, three sections were distinguished in the guideline: a) prevention at the environmental level (advice for the employer); b) prevention at the individual level (advice for the employee); and c) evaluation and maintenance.

With regard to prevention at the environmental level, an environment scan was developed, which consisted of an overview of environmental risk factors from literature that could contribute to prevention of weight gain (for example; availability of bike sheds and shower facilities, pricing strategies in cafeteria). Based on this overview, environmental goals could be prioritized, and feasibility and barriers for implementation could be discussed with the employer and workers' representative council at baseline and at 6-months follow-up.

With regard to prevention at the individual level, the guideline recommends a minimal intervention strategy for OPs on how to promote employees' healthy lifestyle. For this purpose, intervention OPs were trained during 2 days in behavioral change counseling (including role-playing), an adapted form of motivational interviewing suitable for brief consultations in healthcare settings [20]. OPs were asked to conduct five 20-30 minute, face-to-face counseling sessions during the 6-months intervention period. Eligibility of employees was first assessed using an inclusion checklist. Next, OPs applied the minimal intervention strategy by assessing motivation for change, resistance, and providing stage-matched advice. At follow-up, goals were evaluated and maintenance was discussed. OPs were provided with several tools to facilitate change in employees' behavior. Additionally, employees were provided with a toolkit containing a waist circumference measure tape, a pedometer, information leaflets on physical activity and nutrition from the Netherlands Heart Foundations and Netherlands Nutrition Centre, and a diary to monitor behavior.

The last section of the guideline considered the evaluation and maintenance of previous sections. Regarding prevention at the environmental level, the guideline recommended to evaluate to what extent the health policy was carried out after 6 months, using the environment scan. In order to maintain attention for the health policy, it was recommended that the obesogenic environment should be addressed at least once a year with employers and the workers' representative council. Additionally, OPs were asked to evaluate environmental

risk factors that may induce relapse. With respect to prevention at the individual level, OPs were advised to actively provide information with for example monthly posts on intranet, in order to maintain attention for healthy behavior.

### Data collection

Following the recommendations of Linnan and Steckler [3], seven process items were assessed; recruitment, reach, context, dose delivered, dose received, satisfaction and fidelity (Table 1). Additionally, the link between process items and change in waist circumference and body weight was assessed with multilevel linear regression analyses. Data was obtained from questionnaires after the 6 months intervention period and was analyzed at two levels: OPs and employees randomized to the intervention group.

**Table 1.** Process evaluation components and their definition, data collection level and method.

Component	Definition	Level	Data collection method
Recruitment	Sources and procedures used to approach and attract potential participants, the number of randomized OPs and the number of employees that filled out the baseline questionnaire.	OP and Employee	OP follow-up questionnaire and employee baseline questionnaire.
Reach	Number of employees who attended the counseling sessions, reason for missed counseling sessions and the percentage of drop-outs including reason.	OP and Employee	OP registration forms and employee follow-up questionnaire.
Context	Organizational characteristics that affect intervention implementation, including physical, social, political, and economic features.	OP	OP follow-up questionnaire and environment scan.
Dose delivered	The number of intervention materials or components actually delivered by OPs, and the duration and form of the counseling sessions.	OP	OP registration forms and OP follow-up questionnaire.
Dose received	The extent to which participants use materials, resources, or techniques recommended by program.	Employee	Employee follow-up questionnaire.
Satisfaction	Participants' attitudes toward the content, use and limitations of the guideline (OP) or towards the intervention, materials and OP (Employee).	OP and Employee	OP and employee follow-up questionnaires.
Fidelity	The extent to which the intervention was delivered as planned: if OPs adhered to the guideline and adequately performed behavior change counselling.	OP	OP registration forms and taped counselling sessions.
Link between process items and waist circumference and body weight	Multilevel linear regression analyses of process components that may explain the intervention.	OP and Employee	OP registration forms, anthropometric measurements and employee follow-up questionnaire.

### **Recruitment**

At the OP level, recruitment was defined as the sources and procedures used to recruit OPs, the number of OPs that were initially recruited, and the number of OPs that was actually randomized. Additionally, reasons for participation were asked.

At the employee level, recruitment was defined as the sources and procedures OPs used to recruit employees, the number of employees who completed the baseline questionnaire, and the most common reasons for participation and non-participation.

### **Reach**

Reach was defined as the number of employees that attended the counseling sessions. Attendance rates were scored by OPs on registration forms for each counseling session during the intervention period. Reasons for not attending counseling sessions were asked in the employee questionnaire at six months. Furthermore, the number and reason for drop-out were collected continuously by OPs and the principle researcher. If the reason for drop-out was unknown or unclear, OPs and employees were contacted by phone.

### **Context**

Context refers to organizational characteristics that affect intervention implementation, including physical, social, political, and economic features. One multiple choice question on the perceived influence of management support, the economic crisis, time constraints, materials and an open-ended category 'other' was administered in the OP questionnaire at the end of the 6 months intervention period. Additionally, the baseline and follow-up environment scans were analyzed, to assess existing health promotion activities within companies at baseline, and improvements at follow-up.

### **Dose delivered**

Dose delivered was defined as the number of intervention materials or components actually delivered by OPs. In the OP questionnaire, twelve items (yes/no) assessed if OPs had used: the guideline, the environment scan, the registration forms, leaflets for employers, employee eligibility checklist, the minimal intervention strategy, time schedule, protocol for anthropometric measurements, and the four counseling tools (agenda setting chart, risk communication chart, a chart with scales of willingness, importance and confidence to change behavior and a decision matrix). Moreover, the number of counseling sessions delivered by OPs, the duration and the form (face-to-face or by phone) were assessed from the registration forms. Finally, OPs were asked reasons for missed counseling sessions in the 6-months questionnaire.

### **Dose received**

Dose received was defined as the extent to which employees received and used components or materials as recommended by the program. At the end of the 6-months intervention period, employees were asked if they attended any of the counseling sessions with the OP and used the provided materials: the waist circumference measure tape, pedometer,

information leaflets and diary. One open-ended question asked reasons for not using any of the materials.

### Participant satisfaction

We assessed satisfaction among OPs regarding the content, use and limitations of the guideline as (dis)agreement with 22 statements on a five-point Likert scale (Table 2). Satisfaction with the 12 materials or components stated under dose delivered, was assessed with yes or no questions. Finally, OPs were asked to rate the guideline with an overall score on a scale 1-10.

Employee satisfaction was measured in several ways. First, employees were asked if they found the materials (waist circumference measure tape, a pedometer, information flyers and a diary) interesting, clear, and applicable. Second, participants' attitude toward the OP was assessed with a short version of the Patient Satisfaction with OP questionnaire [21], in which seven statements were asked on a five-point Likert scale ranging from 'no agreement' to 'full agreement'. Finally, employees were asked to rate the intervention with an overall score on a scale 1-10.

**Table 2.** Occupational physicians (n=7) agreement with statements on the content, use and limitations of the guideline.

Statements	Agreement (n)
<b>Content of the guideline</b>	
1. The content of the guideline is clear and understandable	6
2. The guideline has a sound scientific basis	5
3. The guideline considers individual characteristics of employees	6
4. The guideline provides enough opportunity for an own assessment	7
5. The guideline provides enough opportunity to take employee preferences into account.	7
<b>Use of the guideline</b>	
6. The guideline fits with the way we work at our occupational health service	5
7. The guideline is feasible for postgraduate courses	5
8. The layout makes the guideline easy to use	3
9. I have not read or remembered the guideline thoroughly	1
10. I find it difficult to change my routines	3
11. I have seen more employees due to this guideline than I would normally have	7
12. I expect to improve my guidance of employees because of this guideline	5
13. I have not achieved good results among my group of employees	2
14. Employees are not cooperating to the guideline	2
15. Working according to this guideline should be compensated financially	1
<b>Limitations of the guideline</b>	
16. Certain components of the guideline are incorrect.	0
17. The guideline is too complex	0
18. I miss certain knowledge to apply the guideline correctly	1
19. The guideline is not feasible due to time constraints	3
20. Working according to this guideline is time consuming	4
21. The time schedule for contact moments is not realistic	4
22. The guideline is feasible, but participating in the research project is time consuming	5

**Fidelity**

Fidelity refers to the extent to which the intervention was delivered according to protocol. Fidelity was assessed in two ways. First, guideline adherence by OPs was assessed from the registration forms with twelve performance indicators (PIs) found relevant by the research team (Table 3). Performance indicators can be used to assess whether the most important recommendations of the guideline were carried out by OPs. Each performance indicator that was met received a score 1, corresponding with guideline adherence. Each performance indicator that was not met received a score 0, reflecting no guideline adherence. An average performance rate was calculated, for which a higher performance rate corresponded with higher guideline adherence.

Second, adherence to behavior change counseling by OPs was assessed by rating three taped counseling sessions per OP with the behavior change counseling index (BECCI) [20]. From each tape 10 minutes were randomly selected and scored by a professional trainer. The eleven items of the BECCI were scored on a 5-point scale ranging from 0 (not at all) to 4 (a great extent), and reflect the degree to which each behavioral change action was carried out. By calculating the mean score, the extent to which OPs practice behavioral change counseling as a whole could be obtained. For example, a mean score of 2.9 shows that behavioral change counseling was carried out 'a good deal', and a score 1.5 shows behavioral change counseling was carried out between 'minimally' and 'to some extent'. Finally, an overall judgment was made if the counseling was client-centered by assessing if the OP spoke (less than) half of the time. The behavior change counseling index shows acceptable levels of validity, reliability and responsiveness [20].

**Effects on waist circumference and body weight**

Multilevel linear regression analyses were performed to determine effects of process items on waist circumference (cm) and body weight (kg) at follow-up, corrected for baseline values, age and gender. Waist circumference was measured as midway between the lower rib margin and the iliac crest to the nearest 0.1 cm. Participants were measured in standing position without heavy outer garments and with emptied pockets, breathing out gently. To standardize waist circumference measurement, OPs or assistants were provided with a Seca 201 waist circumference measure (Seca, Hamburg, Germany). Body weight was determined without shoes and heavy outer garments, to the nearest 0.1 kg. The following process items were analyzed: the number of counseling sessions (continuous), use of materials (1=yes, 0=no), seven statements on satisfaction with OP (1=(fully) agree, 0=neutral and (fully) disagree), rating on a scale 1-10 (1= $\geq$ 8, 0= $<$ 8), and performance indicators (total scores). Analyses were performed using Multilevel software version 2.1 [22]. P-values less than 0.05 were considered statistically significant.



**Table 3.** Performance indicators of guideline adherence, their description and performance rate.

	<b>Performance indicator</b>	<b>Description</b>	OP (n=7)	Employee (n=201)
<b>Prevention at the environmental level</b>				
1	Inventory obesogenic risk factors in the work environment	Risk factors for unhealthy behavior and/or weight have been assessed in the obesogenic work environment with the environment scan.	7 (100%)	
2	Inform and advise employer and workers' representative council	Based on the risk factors, given the current health policy, the employer and workers' representative council are informed and advised.	1 (14%)	
<b>Prevention at the individual level</b>				
3	Use of the checklist to identify individuals at risk for weight gain.	Groups at risk for weight gain are identified using the employee eligibility checklist.		155 (77%)
4	Set objectives: which would the employee like to address	Individual objectives are set		189 (94%)
5	Inventory motivation for change and make an action plan	An action plan is formed		179 (89%)
6	Duration consult	First consult: minimal 15 minutes		201 (100%)
7	Timing consults	Second consult after approximately 3 weeks.		132 (66%)
8	Delivery method	Three face-to-face sessions in the first, second and fifth consult.		160 (80%)
<b>Evaluation and Maintenance</b>				
9	Environmental level	At 6 months, the health policy is evaluated with the environment scan.	3 (43%)	
10	Individual level	At 6 months, the individual plan is evaluated		178 (89%)
11	Maintain prevention at the environmental level by setting prevention on the company agenda and addressing relapse prevention	The (improved) health policy is put on the agenda There is attention for relapse prevention	2 (29%)	
12	Maintain prevention at the individual level by addressing employees' long term goals.	Plans are discussed with the employee to continue healthy environment.		129 (64%)
<b>Total guideline adherence:</b>			47%	82%

## Results

### Recruitment

OPs were recruited by the Netherlands Society of Occupational Medicine via a direct mailing to their member registry in January 2009 (>2,100 OPs). Initially, 38 OPs (2%) expressed an interest to participate, mainly because they wanted to learn how to deal with resistance of

employees towards lifestyle advice, to have a starting point for new health management, or because of corporate social responsibility. After a second, more detailed written description of the project, ten OPs were excluded because they did not meet inclusion criteria (n=7) or their company refused to participate (n=3). Thus, 28 OPs were randomized. Between randomization and the baseline measurement, twelve OPs withdrew due to a lack of time (n=3), their company withdrew (n=4), or their company cancelled the project due to the economic crisis (n=5). Therefore, the Balance@Work project started with seven intervention OPs and nine control OPs.

Employees were recruited between March 2009 and March 2010 by OPs via multiple strategies, such as a personal written invitation, advertisements on intranet or the staff magazine, via management, or during face-to-face consultations. None of the OPs found recruitment difficult. The number of invited employees per OP ranged from 40 to 350. The main reasons mentioned by employees to participate were; to reduce weight, to maintain health, to improve physical activity, and curiosity towards the intervention. Most common reasons for employees not to participate were; no time, no interest, no confidence in a positive result, and already being healthy. In total, 274 intervention employees filled out the baseline questionnaire.

### **Reach**

During the 6-months intervention period, none of the OPs dropped out. Among employees, 237 (86%) filled in the 6-months questionnaire. Reasons for employees to drop-out (n=37) were: lack of time, lack of motivation, missed appointments, change of job, sickness absence, or no reason was given. Based on 201 registration forms from 6 OPs, employees attended 4.4 out of 5 counseling sessions on average. Reasons for not attending counseling sessions (n=16) were: no need, no priority, missed appointments, sickness absence, already being healthy, or no reason was given.

### **Context**

Of the seven intervention OPs, three responded that there were no barriers to implementing the Balance@Work intervention within their company. Four responded that the project took more time than planned due to aspects such as administration and planning. Additionally, two of these OPs stated that employees were difficult to reach and maintain, one had limited materials at her disposal and one had trouble carrying out the intervention because of different company locations. One OP was able to incorporate the guideline into an existing health risk appraisal, the other six OPs set up separate counseling sessions for the Balance@Work study. Lack of management support and the economic crisis were not stated as barriers.

With regard to the content of the baseline environment scans, all companies invested in promoting physical activity and a healthy dietary behavior. For example, all companies promoted transport- and work-related activities (such as a bike plan and sports facilities), and more than half of the companies promoted leisure-time activities (such as sport discounts), provided free fruit at work or offered healthy alternatives in order to reduced energy intake

from snacks. Nevertheless, only three companies discussed the obesogenic environment with management or the workers' representative council. At the 6 months follow-up measurement, three companies showed improvements in the environment scans, such as sports groups and discounts, changes in the cafeteria due to a new caterer, and free fruit at work. Of the companies with improvements, only one OP, however, attributed the recent environment changes to the guideline. The other OPs found changing the environment difficult, because there were already (sufficient) events or facilities present, there was not enough time to implement changes, and it received no priority from the employer.

#### **Dose delivered**

The materials were used by most OPs, except for the leaflets for employers, agenda setting chart and risk communication chart. Of the five counseling sessions, 86% was delivered by OPs. Of these counseling sessions 86% was conducted face-to-face and 14% by phone. The average duration of the sessions was 26 minutes (range 15-60 minutes) for the first meeting, and 18 minutes (range 10-30 minutes) on average for the next four sessions. OPs stated their reason for missed counseling sessions were mainly due to time constraints, such as holidays, and missed appointments.

#### **Dose received**

Based on self-reported data of employees, 72% attended a counseling session. Moreover, 60% read the information flyers, 42% used the waist circumference measure tape, 34% used the pedometer, and 20% used the diary to monitor target behaviors. One participant did not receive the intervention materials. Main reasons stated by 92 employees for not using materials were: lack of time, lack of motivation, no priority, no need not useful, too much work to use materials, the pedometer did not work, or lost the materials.

#### **Participant satisfaction**

Satisfaction of OPs with the content, use and limitations of the guideline was assessed using 22 statements (Table 2). The content of the guideline was evaluated as clear, understandable, and with a proper scientific basis by the majority of the OPs. Moreover, most agreed that the guideline took individual characteristics and preferences of OPs and employees into account. Regarding use of the guideline, OPs felt the guideline fit their work and to be feasible for postgraduate courses. Moreover, all OPs stated to have seen more employees than usual because of the guideline, and most of them expected to improve their performance and to achieve good results. According to OPs, improvements could especially be made on layout of the guideline and on support for OPs in changing their routines. With regard to limitations of the guideline, none of the OPs stated that the guideline was too complex or incorrect. Nevertheless, one OP stated to miss certain knowledge to apply the guideline correctly, three OPs stated the guideline was not feasible due to time constraints, and four stated that working according to this guideline was time consuming and that the time schedule for contact moments was not realistic. However, five OPs attributed time constraints to participating in the research project, and not to using the guideline itself. OPs were satisfied

with the materials as stated in dose delivered, but all found waist circumference difficult to measure. Overall, OPs rated the guideline 7.6 (SD 0.5) on a scale 1-10.

Employees found the counseling sessions and information leaflets most interesting, clear and applicable. However, less than half of the employees found the diary, step counter and waist circumference measure interesting and applicable. Notably, over 80% of the employees agreed with all seven OP satisfaction questions. Overall, employees rated the Balance@Work intervention with a 7.1 (SD 1.0) on a scale 1-10.

### **Fidelity**

Guideline adherence assessed with twelve performance indicators is presented in Table 3. The mean performance rate for the environmental components of the guideline was 47%. Informing the employer and workers' representative council (PI 2), and evaluation and maintenance (PI 9 and 11) could especially be improved. The mean performance rate for the individual components of the guideline was 82%. The timing of consults (PI 7) and individual maintenance plans (PI 12) could be improved. Overall, guideline adherence was moderate. The OPs competence in behavior change counseling was assessed by a professional with the BECCI. Five OPs were able to provide 11 taped counseling sessions. Per OP, scores ranged from 1.4 - 2.5, indicating behavioral change counseling was performed between 'minimally' and 'a good deal'. The mean BECCI score across all taped counseling sessions was 2.1. Thus, OPs generally performed actions 'to some extent'. Higher scores were seen for items 'agenda setting' (i.e. the OP invites the employee to decide what to talk about) and 'empathic listening'. Improvements could especially be made on 'talking about current behavior' and 'talking about behavior change', 'how employees feel about a topic' and 'providing information sensitive to patients concerns and understanding'. All OPs talked (less than) half of the time, indicating that the counseling was performed client-centered.

### **Effects on waist circumference and body weight**

Significant reductions in waist circumference or body weight were seen for employees that attended more counseling sessions based on self-report (-1.5 cm [95% CI -3.0 to -0.1] and -0.8 kg [95% CI -1.8 to 0.3]) and based on registration forms (-2.1 cm [95% CI -3.1 to -1.1] and -1.2 kg [95% CI -1.9 to -0.4]). Significant reductions were also seen for employees who agreed that the counseling sessions improved their physical activity and dietary behavior (-2.1 cm [95% CI -3.3 to -0.9] and -0.9 kg [95% CI -1.8 to -0.1]), and rated the Balance@Work intervention an 8 or higher (-1.9 cm [95% CI -3.1 to -0.7] and -1.4 kg [95% CI -2.2 to -0.5]). No effects were found for employees who used the materials (diary, pedometer, waist circumference tape and information leaflets), and for performance indicators (data not shown).

### **Discussion**

The aim of this paper was to describe the process of the Balance@Work intervention. The results show that reach and satisfaction in general was high. Moreover, employees with higher attendance and satisfaction rates showed significant improvements on waist

circumference and body weight. However, the results from the items fidelity and context show that the environmental component and the behavioral change counseling need revisions in order to increase potential of the guideline for practical application.

The recruitment of OPs via the Netherlands Society of Occupational Medicine allowed for a fast and easy recruitment. Compared to participation rates of 9%-22% from other worksite health promotion programs however, our participation rate of 2% is low [23]. This may indicate that our group of OPs is selective and highly motivated, and thus cannot be considered representative for all Dutch OPs. Nevertheless, no extra recruitment efforts were made as we reached a sufficient number of OPs for our study. Moreover, reasons for those OPs who withdrew between randomisation and baseline were all related to the companies and not to motivation of OPs. As all OPs remained in the study at follow-up, it seems that the guideline met their need for evidence- and practice based methods and strategies to promote physical activity and healthy dietary behavior [4].

Overall, the guideline was partly implemented by OPs as intended with respect to the environmental level, but performed well at the individual level compared to other studies examining the effectiveness of guideline-based care [24-26]. At the environmental level, the baseline environment scans showed that all companies already invested in workplace health promotion before our trial. Contrary to expectations however, only one OP attributed improvements in the environment scans at follow-up to performing the guideline. Thus, there seems to be a gap between assessing the obesogenic environment and actually changing this environment. The guideline may not have provided sufficient practical guidance or materials for OPs to implement simple environmental changes within 6 months that have shown to be effective, such as prompts on posters to increase stair use [27], or point-of-purchase signs and food labeling to improve dietary behavior [28]. Such changes may be difficult to induce, but are viewed by experts as essential for obesity prevention [29,30]. Second, although management support was not stated as a barrier, OPs found that their suggested changes did not receive priority from employers. A challenge thus appears to encourage employers to participate. More attention could be paid in the guideline training to physician-employer communication skills [31]. Also, the guideline should encourage the formation of a linkage board. A linkage board can encourage collaboration among all relevant stakeholders, and has previously resulted in effective implementation [19,23]. Specific intervention agreements could even be documented and signed by all stakeholders, in order to ensure that all stakeholders perform their part [32].

The high guideline adherence of OPs at the individual level suggests that this part of the guideline was sufficiently practice-based. The specific attention in the guideline and training for dealing with resistance of employees towards OPs seems to have worked well. OPs did not perceive recruitment of employees to be difficult, and in line with other studies that intervened on employees through OPs, reach was high [33-36]. Moreover, most OPs were able to perform at least three face-to-face counseling session, within the time frame of actual consults (20-30 minutes). Assessment of the counseling sessions with the BECCI however, showed that OPs generally counseled 'to some extent'. This may be an overestimation as not all OPs returned taped sessions. Additionally, OPs stated that they

felt their counseling skills were insufficient to help employees when stagnation occurred and had a need for more guidance in changing their own routines. A 2-day training with role play was previously sufficient to produce significant improvement in behavioral change counseling skills [37]. Also, better use of counselling skills during weight loss discussions may predict patient weight loss [38]. The training should therefore be improved by focusing more on practicing behavioral change counselling with role play, relapse prevention and changing own routines, and less on project information. Finally, as the personal feedback to OPs was provided near the end of the intervention period and studies have shown that on-demand feedback and advice increases skillfulness [39], OPs should be given more feedback during the intervention period and made aware of refresher counseling courses that are available online which provide direct feedback.

Due to the lack of effect on performance indicators, no part of the guideline could be identified as more effective. The performance indicators however did show that the low attention for maintenance is a pressing problem. Although most OPs evaluated goals with employees at follow-up, they did not discuss long term goals. Moreover, only two OPs stated that maintenance, including attention for relapse prevention, had been set on the company agenda. To date, it remains difficult to achieve sustained attention for weight gain prevention within the workplace [40]. OPs generally work on short contracts and may therefore not have the opportunity to invest in long term plans. To support OPs and employers in constituting evaluation and maintenance plans, examples of successful worksite health promotion initiatives could be added to the guideline [40]. Moreover, performance of the guideline should be linked to existing structures, such as health risk appraisals, to further stimulate continuation and maintenance of health initiatives at the workplace.

Both OPs and employees were satisfied with the intervention. Their positive feedback possibly results from the development of the intervention in collaboration with the key stakeholders, according to the Intervention Mapping protocol [19]. Improvements could still be made. The lay-out of the guideline was not appreciated, and measuring waist circumference was perceived as difficult. Moreover, OPs stated that the time schedule of five sessions in 6 months was dense, and missed appointments could not always be rescheduled. Nevertheless, time constraints were rarely attributed to executing the guideline itself, but merely to participating in the research project. Employee satisfaction with the OP was very high, possibly because employees felt they could talk freely as OPs counseled client-centered instead of dominant [41]. Most employees did not use the intervention materials, and evaluated them as less interesting, clear and applicable. Clearly, the counseling sessions are a key intervention component.

The significant effects of higher satisfaction and attendance rates on waist circumference and body weight suggests that the most motivated employees will reach better results. This is not surprising, as those who consider the sessions useful are more inclined to adhere to it, and thus more likely to decrease their weight. Similarly, a study on improving fruit and vegetable consumption in children, found that those who enjoyed the project showed significant effect of the intervention compared to those who liked it the least [42]. Thus, focusing on ways to motivate employees may pay off in effects [43].

---

## **Conclusion**

The results of this process evaluation indicate that the guideline was partly implemented by OPs as intended on the environmental level, but performed well at the individual level. Improvements should be made on both the content and performance of the guideline before implementation, such as better practical guidance or materials for OPs to implement simple environmental changes, the formation of a linkage board, providing examples of successful worksite health promotion initiatives, and linking the guideline to existing health risk appraisals. Moreover, the training should focus more on relapse prevention, physician-employer communication skills, feedback and changing OPs' routines. Finally, more attention should be paid to correctly measuring waist circumference, as measurement error will influence results. These suggestions may also apply for developers of other lifestyle interventions. As workplace health promotion via this occupational health guideline enables successful reach, satisfaction, and effectiveness among employees with higher attendance and satisfaction rates, the guideline may have good potential after these adaptations for broader successful implementation of among occupational health services in the Netherlands.

## Reference List

1. Hulshof CT, Verbeek JH, van Dijk FJ, van der Weide WE, Braam IT: Evaluation research in occupational health services: general principles and a systematic review of empirical studies. *Occup Environ Med* 1999, 56: 361-377.
2. Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L et al.: Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess* 2004, 8: iii-72.
3. Linnan L, Steckler A: Process evaluation for public health interventions and research: an overview. In *Process evaluation for public health interventions and research*. Edited by A. Steckler & L. Linnan (Eds.). Jossey-Bass Incorporated; 2002:1-23.
4. Verweij LM, Proper KI, Weel AN, Hulshof CT, van MW: Design of the Balance@Work project: systematic development, evaluation and implementation of an occupational health guideline aimed at the prevention of weight gain among employees. *BMC Public Health* 2009, 9: 461.
5. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS et al.: Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA* 2003, 289: 76-79.
6. Flegal KM, Graubard BI, Williamson DF, Gail MH: Cause-specific excess deaths associated with underweight, overweight, and obesity. *JAMA* 2007, 298: 2028-2037.
7. Finkelstein EA, Trogdon JG, Cohen JW, Dietz W: Annual medical spending attributable to obesity: payer- and service-specific estimates. *Health Aff (Millwood)* 2009, 28: w822-w831.
8. Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser* 2003, 916: i-149, backcover.
9. Moher D, Schulz KF, Altman DG: The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomised trials. *Lancet* 2001, 357: 1191-1194.
10. Brownson RC, Fielding JE, Maylahn CM: Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health* 2009, 30: 175-201.
11. Grol R, Wensing M: What drives change? Barriers to and incentives for achieving evidence-based practice. *Med J Aust* 2004, 180: S57-S60.
12. Madan I, Harling K: The NHS Plus evidence-based guideline project. *Occup Med (Lond)* 2007, 57: 307-310.
13. Oakley A, Strange V, Bonell C, Allen E, Stephenson J: Process evaluation in randomised controlled trials of complex interventions. *BMJ* 2006, 332: 413-416.
14. Brook RH, McGlynn EA, Cleary PD: Quality of health care. Part 2: measuring quality of care. *N Engl J Med* 1996, 335: 966-970.
15. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA et al.: Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc* 2007, 39: 1423-1434.
16. Health Council Netherlands. *Guideline Nutrition (available in Dutch)*. 2006/21. 2006. The Hague. Ref Type: Report
17. Lean ME, Han TS, Morrison CE: Waist circumference as a measure for indicating need for weight management. *BMJ* 1995, 311: 158-161.
18. Hulshof CTJ. *Introductie NVAB-Richtlijnen*. 2009. Utrecht, Kwaliteitsbureau NVAB. Ref Type: Report
19. Bartholomew LK, Parcel GS, Kok G, Gottlieb NH: *Planning health promotion programs. An Intervention Mapping approach*, 2nd edn. San Francisco, CA: Jossey-Bass; 2006.
20. Lane C, Huws-Thomas M, Hood K, Rollnick S, Edwards K, Robling M: Measuring adaptations of motivational interviewing: the development and validation of the behavior change counseling index (BECCI). *Patient Educ Couns* 2005, 56: 166-173.
21. Verbeek JH, de Boer AG, van der Weide WE, Piirainen H, Anema JR, van Amstel RJ et al.: Patient satisfaction with occupational health physicians, development of a questionnaire. *Occup Environ Med* 2005, 62: 119-123.
22. Rasbash J, Charlton C, Browne WJ, Healy M, Cameron B, MLwiN. [2.1]. 2009. University of Bristol, Centre for Multilevel Modelling. Ref Type: Computer Program



23. Kwak L, Kremers SP, van Baak MA, Brug J: Participation rates in worksite-based intervention studies: health promotion context as a crucial quality criterion. *Health Promot Int* 2006, 21: 66-69.
24. Rebergen DS, Bruinvels DJ, Bezemer PD, van der Beek AJ, van MW: Guideline-based care of common mental disorders by occupational physicians (CO-OP study): a randomized controlled trial. *J Occup Environ Med* 2009, 51: 305-312.
25. Nieuwenhuijsen K, Verbeek JH, Siemerink JC, Tummers-Nijssen D: Quality of rehabilitation among workers with adjustment disorders according to practice guidelines; a retrospective cohort study. *Occup Environ Med* 2003, 60 Suppl 1: i21-i25.
26. Anema JR, Jettinghoff K, Houtman I, Schoemaker CG, Buijs PC, van den BR: Medical care of employees long-term sick listed due to mental health problems: a cohort study to describe and compare the care of the occupational physician and the general practitioner. *J Occup Rehabil* 2006, 16: 41-52.
27. Kwak L, Kremers SP, van Baak MA, Brug J: A poster-based intervention to promote stair use in blue- and white-collar worksites. *Prev Med* 2007, 45: 177-181.
28. Engbers LH, van Poppel MN, Chin APM, van MW: Worksite health promotion programs with environmental changes: a systematic review. *Am J Prev Med* 2005, 29: 61-70.
29. Swinburn B, Egger G: Preventive strategies against weight gain and obesity. *Obes Rev* 2002, 3: 289-301.
30. Kremers SP, de Bruijn GJ, Visscher TL, van MW, de Vries NK, Brug J: Environmental influences on energy balance-related behaviors: a dual-process view. *Int J Behav Nutr Phys Act* 2006, 3: 9.
31. Berkhof M, van Rijssen HJ, Schellart AJ, Anema JR, van der Beek AJ: Effective training strategies for teaching communication skills to physicians: An overview of systematic reviews. *Patient Educ Couns* 2011, 84: 152-162.
32. Tiemessen IJ, Hulshof CT, Frings-Dresen MH: Effectiveness of an occupational health intervention program to reduce whole body vibration exposure: an evaluation study with a controlled pretest-post-test design. *Am J Ind Med* 2009, 52: 943-952.
33. Groeneveld IF, Proper KI, Absalah S, Beek AJvd, van MW: An individually based lifestyle intervention for workers at risk for cardiovascular disease: a process evaluation. *Am J Health Promot* 2011, 25: 396-401.
34. Digenio AG, Mancuso JP, Gerber RA, Dvorak RV: Comparison of methods for delivering a lifestyle modification program for obese patients: a randomized trial. *Ann Intern Med* 2009, 150: 255-262.
35. Lambeek LC, van MW, Buijs PC, Loisel P, Anema JR: An integrated care program to prevent work disability due to chronic low back pain: a process evaluation within a randomized controlled trial. *BMC Musculoskelet Disord* 2009, 10: 147.
36. van Oostrom SH, van MW, Terluin B, de Vet HC, Anema JR: A participatory workplace intervention for employees with distress and lost time: a feasibility evaluation within a randomized controlled trial. *J Occup Rehabil* 2009, 19: 212-222.
37. Lane C, Hood K, Rollnick S: Teaching motivational interviewing: using role play is as effective as using simulated patients. *Med Educ* 2008, 42: 637-644.
38. Pollak KI, Alexander SC, Coffman CJ, Tulsy JA, Lyna P, Dolor RJ et al.: Physician communication techniques and weight loss in adults: Project CHAT. *Am J Prev Med* 2010, 39: 321-328.
39. Brug J, Spikmans F, Aartsen C, Breedveld B, Bes R, Ferreira I: Training dietitians in basic motivational interviewing skills results in changes in their counseling style and in lower saturated fat intakes in their patients. *J Nutr Educ Behav* 2007, 39: 8-12.
40. Heinen L, Darling H: Addressing obesity in the workplace: the role of employers. *Milbank Q* 2009, 87: 101-122.
41. Bertakis KD, Roter D, Putnam SM: The relationship of physician medical interview style to patient satisfaction. *J Fam Pract* 1991, 32: 175-181.
42. Bere E, Veierød M, Bjelland M, Klepp K. Outcome and process evaluation of a Norwegian school-randomized fruit and vegetable intervention: Fruits and Vegetables Make the Marks (FVMM). *Health Educ. Res.* 21[2], 258-267. 2005. Ref Type: Magazine Article
43. Chan RS, Woo J: Prevention of overweight and obesity: how effective is the current public health approach. *Int J Environ Res Public Health* 2010, 7: 765-783.