Author's response to reviews

Title: The effects of a controlled worksite environmental intervention on determinants of dietary behavior and self-reported fruit, vegetable and fat intake

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Author's response to reviews: see over
Dear referees,

Thank you for revising our manuscript! It took a while to respond because we had to wait to receive a trial registration number that is necessary for publication in BMC. We commented on all the point raised by you, and revised when necessary. We do believe that the comments increased the quality of the manuscript and we hope that the revisions will be satisfactory and the paper can be published in BMC public health.

Kind regards,

Luuk Engbers

**COMMENTS ON REVIEWERS REPORT**

**Referee 1:**
This referee, did not require revisions.

**Comment Referee 2:**
My major concerns are methodological/statistical, and regarding the conclusions.

Methodological/statistical: This is a group-randomized nested design within 2 groups. The study design needs clarification. Was the allocation of the intervention random? It seems that the study was a longitudinal design (surveying the same employees overtime) but it is not mentioned in the manuscript. The statistical analysis was linear regression but the nested design was not accounted for in the analysis. Employees within worksite may be more similar to each other than between worksites in a way that can influence the results of the intervention. There is a vast literature in group randomized trial that provide a rationale for a mixed model analysis for this kind of design and also estimated of IntraClass Correlation Coefficient for worksites that can be used for power calculations. Since the n of this study is 2 and there were relatively few employees per group, the manuscript should inform of the statistical power to detect a difference between intervention and control groups.

**Response of the author:**
Using a mixed model (or multilevel) analysis is only appropriate when there were (for instance) many companies. In fact, when that situation occurs, one wants to correct for the dependency of the observations within the different companies, which can be done by adding dummy variables for each company to the regression analyses. However, when the number of companies is very high, it is not possible to correct for this by adding dummy variables, and therefore Mixed model (or multilevel) analysis is developed. However, in the present study we only have two companies, so if we want to correct for company we can just put the dichotomous variable into the regression model. Because this dichotomous variable is exactly the same as the variable indicating the intervention versus control group, by adding the intervention variable, we already correct for ‘company’. In other words, we don’t believe, a mixed model (or multilevel) analysis is necessary in this particular situation. Of course, the fact that we only have one company in the intervention and one company in the control group is a limitation of the study, but the problems accompanying these limitations are not solved by using mixed model (or multilevel) analysis.

The intervention within the intervention company was partially random, because all employees in the intervention company had the opportunity to participate. However, only the
employees that replied to the call to participate and were eligible for participation were included. In addition, randomization in multi-worksite (n > 2) intervention trials is performed usually at the level of the worksite. As this trial had only one intervention and control worksite, this kind of randomization was not possible. Although randomization would have increased the quality of this study, including more worksites in the study was logistically and financially not feasible. In addition, randomization at the level of the individual was not performed, because an environmental intervention is by definition accessible for all employees at the intervention worksite, as Glanz et al (1997) defined environmental intervention strategies as: ‘All strategies that do not require the individual to self-select into a defined educational program (i.e., self-help programs, classes or groups)’. Consequently, in an intervention like ours it is impossible to randomly select subjects to the intervention or control condition within one worksite.


Comment referee 2: The first reason to explain the lack of effect is power. This is not mentioned anywhere in the conclusions and it is the first thing that comes to mind when reading the results.

Response of the author: Because the primary aim of the FoodSteps project was to prevent overweight, the primary outcome of the study was BMI. With 450 subjects in each group, a difference of 0.2 standard deviations in BMI could be demonstrated with an alpha of 0.05 and a beta of 0.20. With a standard deviation of 2.0 in BMI, this means a difference of 0.4 in BMI could be demonstrated. This study presents however the effects of this intervention of secondary outcome (dietary habits) and a power calculation on fruit intake was not performed at the beginning of the study.

However, with a power van 0.8 en alpha of 0.05, a difference of about a half (0.42) piece fruit and 20.7 grams of vegetables could be demonstrated with the number of participants (n = 515) in our study. Therefore we did not find it necessary to include a paragraph about power in the manuscript, but if the referee insists we will, of course, add this information to the manuscript.

Comment referee 2: I totally agree with the author that the intervention was too modest. A lack of intensity of the intervention is obvious. The studies mentioned in the conclusion that did found a positive effect of the intervention had multiple approaches and higher intensity. Also, this project does not seem to have done any prior formative research in terms of the perceptions and beliefs of the employees with respect to eating behaviors at work. I think this should be mentioned as a limitation of the study. It is mentioned that employees had a good intake of fruits and vegetables at baseline, formative research would have provided input on strategies to further improve it. Another limitation is the absence of process and evaluation.

Response of the author: The referee raises a good point regarding doing formative research. However due to a lack of time of preparing and implementing the intervention (1 year), this was not possible. The total time for the project was 3 years, and only for this period financing was obtained. A process evaluation among members of the project group at the intervention company was performed at the end of the study, however, due to space restrictions and the scope of this paper, the results of this evaluation were not added in this paper.
Comment referee 2: Reported behaviors did not change much but, was there an increase in sales of fruit and vegetables and/or low fat foods in the cafeterias and vending machines.

Response of the author: We agree with the referee regarding the inclusion of objective sales data in the analyses, however a setback of this study was that the actual and objective sales data of the company canteen were not accessible to analysis. At the intervention worksite, these objective sales data could be linked to the unique number of the subjects’ company access (credit) card. Thus, in theory the data could be retrieved by a click of a button. Unfortunately, it appeared that the sales information was not specific enough. For example, no distinction could be made between high or low fat products (e.g., low or full fat milk), and no distinction between snacks and hot meals. Also, logistical and organizational problems played a role in not being able to analyze the objective sales data. Moreover, at the control worksite no automated sales data collection and retrieval was possible.

Minor Essential Revisions

Comment referee 2: Abstract: last sentence is akward.
Response of the author: Sentence was removed from the abstract

Comment referee 2: Background:
First sentence, first paragraph it says 'under employees', should be 'among employees'.
Response of the author: This error is corrected.

Comment referee 2: Why BMI less than 23 were excluded?
Response of the author: The rationale for the BMI criterion is added to the manuscript

Comment referee 2: Results on Fat Intake:
Table 2 is mentioned. It should be table 3
Response of the author: Table 2 is changed into table 3

Comment referee 2: Discussion:
The authors mentioned that perceived social support increase significantly short and long term. Table 2, however, shows not significant results long term (p = 0.07)
Response of the author: This sentence is changed into borderline significant at long-term.