Author's response to reviews

Title: Adherence of pregnant women to Nordic dietary guidelines in relation to postpartum weight retention: Results from the Norwegian Mother and Child Cohort Study

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Author's response to reviews: see over
Dear Natalie Pafitis!

January, 10th, 2014

We are happy to resubmit the revised manuscript ‘Adherence of pregnant women to Nordic dietary guidelines in relation to postpartum weight retention: Results from the Norwegian Mother and Child Cohort Study.’ for your consideration for possible publication as research article in BMC Public Health.

On the following pages we indicate point-by-point how we have addressed the comments raised by the reviewers.

Best regards on behalf of all authors,

Anne von Ruesten, first author
Reviewer 1:

Reviewer's report

Title: Adherence of pregnant women to Nordic dietary guidelines in relation to postpartum weight retention: Results from the Norwegian Mother and Child Cohort Study

Version: 1 Date: 27 November 2013

Reviewer: Marlein Ausems

Reviewer's report:

The article deals with an important and interesting topic, namely the relation between adherence of diet and weight retention postpartum. The intermediate role of gestational weight gain is also considered.

Some points to consider (following the reviewer's form):

1. Is the question posed by the authors well defined?

The question posed by the authors might improve by including the relation between diet adherence and gestational weight gain.

We included a further sentence at the end of the introduction (page 5, line 95-96) where we stated that “Furthermore, we studied the relationship between adherence to these Nordic dietary guidelines and gestational weight gain as a potential intermediate outcome.” However, we decided not to include this into the title and abstract of the manuscript since this was not our primary research question.

2. Are the methods appropriate and well defined?

Considering weight retention postpartum and diet adherence the methods section is carried out in detail, however the construct GWG remains unclear. It is stated that excessive GWG is based on the updated IOM criteria, more details about the construction is necessary.

We clarified what is meant by excessive GWG (see page 13, lines 274-277):
“Excessive GWG was defined depending on the pre-pregnancy BMI based on the updated IOM criteria [22], i.e. >18 kg for BMI<18.5 kg/m², >16 kg for BMI of 18.5-24.9 kg/m², >11.5 kg for BMI of 25-29.9 kg/m², or >9 kg for BMI≥30 kg/m², respectively.”

3. Are the data sound?

Data are sound, except for the GWG results. Also attention should be paid to table two, the description of the BMI categories is incorrect.

With reference to the association of high adherence to Norwegian food guidelines with reduced GWG, the results were in line with our expectations. However, this was not the case for high adherence to Nordic Nutrition Recommendations as this was surprisingly associated with increased GWG. A detailed look at the single components of these recommendations might help to understand this controversy. As shown in Table 5, there was a quite strong
positive association of higher adherence to recommendations for total fat intake (but also PUFA and intake of added sugar) with increased GWG. It can be speculated that this might be an effect caused by some reporting error in the dietary data since particularly foods rich in fat and added sugar are prone to conscious or unconscious mis- or under-reporting (Olafsdottir et al., 2006, Ann Nutr Metab50(5):450-60).

The description of BMI categories in Table 2 is corrected now.

4. Does the manuscript adhere to relevant standards for reporting and data deposition?

Apparently sufficient

5. Are the discussion and conclusions well balanced and adequately supported by the data?

In the discussion lines 355-357 are unclear, as these results can not be found in the results section (total energy intake).

The statement that inverse associations of the HEI-NFG and HEI-NNR with weight retention after birth appeared to be independent of total energy intake refers to the observation that these associations were present although the regression models were adjusted for total energy intake amongst several other potential confounder variables (see Table 4). We highlighted the role of total caloric intake within these models based on the assumption that the association between higher adherences to Nordic dietary guidelines with lower postpartum weight might be driven by a lower total caloric intake, which was not confirmed by our data.

We have added to the results section the following sentence: “These inverse associations of the HEI-NFG and HEI-NNR with weight retention after birth were independent of total energy intake.” (See results, lines 313-314).

Another question remains: ‘What about the generalizability of the results to other countries with different nutrition recommendations (e.g. lower vegetables fruit norms)?”

It is hard to make a statement about the generalizability of our results since evidence from other studies with a comparable research question are very scarce. “There is one recent longitudinal study showing that diet quality postpartum, assessed by the adherence to either a Mediterranean style diet or the Dietary guidelines for Americans, was not associated with postpartum weight retention [30]. In contrast, Stendell-Hollis et al. found in an interventional trial that adherence to either a Mediterranean style diet or the US Department of Agriculture (USDA) My Pyramid diet support the promotion of postpartum weight loss [31] but this study only covers the lactation period. Hence, it is not clear whether this is transferable to the effect of diet during pregnancy on postpartum weight.” (See discussion, lines 400-407)

Another point of discussions are implications for future interventions. What would the authors recommend to stimulate healthy GWG, weight postpartum?

Promoting the knowledge on national dietary guidelines, particularly food-based ones, within the specific group of pregnant women among the more general recommendation to maintain a balanced diet and physical activity may help to contribute to prevention of undesirable maternal weight development. However, there is still a need for further research to evaluate the role of specific national dietary guidelines for a successful weight management during and after pregnancy (see final paragraph of the manuscript).
Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

'I declare that I have no competing interests'
Reviewer 2:

Reviewer's report

Title: Adherence of pregnant women to Nordic dietary guidelines in relation to postpartum weight retention: Results from the Norwegian Mother and Child Cohort Study

Version: 1 Date: 5 November 2013

Reviewer: Rüdiger von Kries

Reviewer's report:

The authors have the opportunity to analyze a unique data set and do so professionally. The construction of the explanatory score variable is clever, the conduct of the analyses is appropriate and the discussion is to the point. I only have two major concerns:

- Adjusting for GWG, which may or may not be in the causal pathway, needs further explanation. What is presumed pathophysiological concept? Is there priming by nutrient components in utero? Is the effect mediated by GWG?

We assume that GWG is an intermediate as "excessive weight gain during pregnancy is found to be related with increased weight retention in the postpartum period [2-4]. (See Background, lines 65-68)"

The results from the linear regression analyses also strengthen this assumption since inclusion of GWG into the models notably affects the effect estimates describing the association between adherence to Nordic dietary guidelines and postpartum weight retention (see Table 4). However, this impact was not as strong when considering GWG within the logistic regression models, as all associations were inverse, independent of adjustment for GWG (see Figure 2).

To directly clarify the role of GWG in those models for the reader, we now have changed the results section in the abstract (see lines 43-49), restructured the result discussion (lines 352 ff) and adapted the conclusion.

- Is diet in pregnancy a surrogate for the maternal diet - after pregnancy?

"Concerning maternal diet, we assume that some aspects of eating during pregnancy are likely to continue during the postpartum period, as also reported in the literature [33], and that both pre- and postpartum diets are contributing factors to postpartum weight retention" (See discussion lines 427-430).


Thank you, we have now included this fact and the reference in the background section (lines 65-68).

We agree that recommendations to reduce excessive GWG used in interventional trials are often quite unspecific, which is also mentioned in the introduction (lines 77-82) “Although the number of interventional trials to manage weight gain during [9-11] and after [10] pregnancy through a modification of physical activity or diet [9, 11, 12] is increasing, it has not yet been examined how adherence to specific dietary guidelines during pregnancy affects gestational weight gain or postpartum weight. Furthermore, there is uncertainty which specific components of the diet, e.g. nutrients or foods, might have the strongest potential to contribute to prevention of excessive weight gain [13].”

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

'I declare that I have no competing interests'
Reviewer 3:

Reviewer's report

Title: Adherence of pregnant women to Nordic dietary guidelines in relation to postpartum weight retention: Results from the Norwegian Mother and Child Cohort Study

Version: 1  Date: 4 November 2013

Reviewer: Jesus Vioque

Reviewer's report:

This is a well written manuscript on a relevant topic for which existing information is still scarce. Data from the prospective mother-child study (MoBa Study) are used to conclude that women with higher adherence to Norwegian food guidelines or Nordic Nutrition Recommendations during pregnancy present lower postpartum weight retention. The study is well conducted and the analysis is well conducted although some concerns on internal and external validity should be addressed:

A general comment regarding the 6-months period used to check postpartum weight retention. It should be considered this may be a too short period to explored weight retention since 82.2% of women declared breastfeeding up to 6 months postpartum. Was the association found or still evident for women breastfeeding below 6 months postpartum?

We agree that breastfeeding is an important factor that may confound the observed inverse associations between adherence to Nordic dietary guidelines and postpartum weight retention. Therefore, all analyses were already adjusted for the duration of breastfeeding up to 6 months postpartum. Since the proportion of women that reported to be still breastfeeding 6 months after birth was very high, we now also conducted a subgroup analysis among women with breastfeeding duration of less than 6 months postpartum. In doing so, it turned out that the observed association between increased adherence to Norwegian food guidelines and decreased postpartum weight retention was still evident and even strengthened. Conversely, the relationship between compliance to Nordic Nutrition Recommendations and postpartum weight retention was weakened, which can be explained by the smaller variability of the HEI-NNR compared to the HEI-NFG score. This is also mentioned in the discussion now (lines 431-439).

1. Line 112. After exclusions were made, participants were 47011 women. Can the participation rate clarified? Are these women different from the 90.700 women from the initial cohort participants as stated in line 97?

The final participation rate in MoBa was recently corrected to 40.6%. The low participation rate in MoBa is a concern. A comparison of MoBa participants with non-participating pregnant Norwegian women showed that MoBa participants comprise less young mothers (<25 years) and less women living alone as well as less women with two or more previous pregnancies [32]. Nevertheless, a study of potential self-selection bias showed that despite a different prevalence of exposures and outcomes compared to the total population of pregnant women, no statistically relevant differences regarding eight selected exposure-outcome
associations were found [32]. (See discussion line 415-423). The study sample in the present study was restricted to women with singleton live pregnancies, women with complete data on weight, height and other crucial variables (see methods lines 113 ff.). The women included in the study were slightly younger than the total sample because we only include their first time participation in MoBa (mean age 30.0 in study sample vs 30.2 in full sample). Other than that, the differences are considered to be minor.

2. Lines 226-232. Weight was self-reported. Is there any evidence of validity on self-reported weight among Women in Norway?

There are no studies investigating the reliability of self-reported weight among women in Norway. However, based on international studies like e.g. Engström et al, 2003 and Rowland, 1990, underestimating of weight is likely to occur also in this study. However, given that the degree of underestimation remains fairly constant per woman at all three time points (pre-pregnancy, during pregnancy and postpartum) the estimates of changes in weight may be fairly accurate.

3. In order to make comparisons and external validity of weight retention after approximately 15 months (from pre-pregnancy self-reported weight to 6 months postpartum), it should be taking into account that women may increase their weight. It has been reported that mean weight gain per decade may be close 4-5 kg, i.e. mean weight gain of approximately 0.5 kg per year. Thus, are there any data from Norway to compare the mean weight gain among women around 30 years old?

Again, there are no studies of mean weight gain among Norwegian women around 30 years old. Data for the nulliparous women in our dataset showed that their mean weight prior to pregnancy increased slightly with increasing age (Pearson correlation=0.05), mean weight at 29 years: 66.6 kg; 30 years: 67.2 kg; and 31 years: 67.3 kg. As all analyses were adjusted for maternal age, we are unsure how to address the comment about taking into account the mean weight increase in order to make comparisons and external validity of weight retention over the period of 15 months.

4. Line 277. Please clarify on “data not tabulated” Does it mean they were not presented?

“Data not tabulated” means that they are not presented in the result tables.

5. Regarding the two Healthy Eating Index scores, NFG and NNR. There is some concern regarding the mean scores for study participants, close to the middle range for NFG (0-70) and very close to the maximum (0-50) for NNR. Is there any explanation for these results? Have these index been validated?

This comment also relates to the sentence in lines 344-346.

Mean scores for HEI-NNR were on average closer to the maximum compared to the HEI-NFG scores based on the observation that adherence to nutrient recommendations was in generally quite high, except for saturated fat. Conversely, concerning intake of food groups considered in the NFG, the participants only showed good adherence to the recommendations for whole-grain, red meat and added sugar intake but just weak to moderate adherence with recommendations for the other food groups. Particularly for vegetables and fatty fish intake just a small proportion showed compliance with food recommendations (see also Results, lines 299-304 and Table 3).
This result in a higher variability of the HEI-NFG compared to the HEI-NNR score. Therefore, it can be argued that the HEI-NFG has a higher validity due to a better ability to discriminate between people with different dietary intakes.

6. A column for p-values should be included in table 2 for comparison purposes of HEI among categories of variables.

Due to large sample size, nearly every comparison reveals a significant difference according to the p value, even when the differences of HEI scores are very small. Thus, inserting a p value into Table 2 would not be so meaningful for data interpretation. Furthermore, the table would become too large when inserting all the p values so that we decided not to address the p values in this table. Instead, we inserted an additional sentence into the results part to mention that nearly all differences of HEI scores across categories were statistically significant (p<0.001) (except for the comparison of the HEI-NNR score across categories of alcohol intake) (lines 295-297).

7. Line 311. Regarding HEI in table 1 and specific food groups presented in table 1 and 5, it would be helpful an appendix with a list of main foods of the FFQ that were included in the food groups of the NFG, particularly for those food items such as fish, fatty fish, added sugar for which some associations were found.

We thank the reviewer for this comment and now included a supplementary table where we specify the food groups considered within the NFG and the respective FFQ food items and variables that are assigned to these food groups.

8. In order to generate scores in HEI-NNR nutrients were used as percentage of energy intakes. It would be of interest to see if the associations found for Fat, MUFA, etc were also present for absolute intakes either crude intakes or adjusted for total calories.

Both scores, the HEI-NFG and the HEI-NNR, were generated to measure the adherence to the existing Nordic dietary guidelines. The Nordic Nutrition Recommendations (NNR) are generally given as percentage of energy intake (except for fibre) and not as absolute intakes, so that we can just refer to these specifications. Nonetheless, it can be expected that a score based on absolute nutrient intakes that are adjusted for total energy intake would yield similar results.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interest