Author's response to reviews

Title: Intakes of culinary herbs and spices from a food frequency questionnaire evaluated against 28-days estimated records

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Version: 2 Date: 24 March 2011

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

Please find enclosed the revised manuscript, MS: 2849893750897099, entitled: "Intakes of culinary herbs and spices from a food frequency questionnaire evaluated against 28-days estimated records", by Lene Frost Andersen, Rune Blomhoff, and myself.

Below you will find our point by point response to the concerns. In the revised manuscript all changes in the text are marked red.

Yours sincerely,

Monica Hauger Carlsen

POINT-BY-POINT RESPONSE TO THE REVIEWERS CONCERNS.

Report from reviewer 1 Samir Samman

Specific comment 1

The data need to be evaluated by using the Bland Altman analysis. This will allow the authors to determine whether there is any systematic bias between the 2 methods.

Our response: We have now performed Bland Altman analyses for the 8 herbs and spices in tables 1, 2 and 3, for both frequencies and portion sizes, respectively. The individual analyses showed no common general trend or systematic bias.

For frequencies of intake, the differences between methods showed a trend towards overestimation by the FFQ with increasing mean frequencies for pepper and barbeque spice. For the other 6 herbs/spices there were no general trend, instead the differences were dispersed evenly above and below the mean difference, except for a few extreme outliers with very big overestimations from the FFQ.

For the analyses of differences in portion sizes of the individual herbs and spices, no general trend was seen except for the taco spice which showed a tendency to be underreported by the FFQ with increasing mean portion size.

We have also analysed the Bland Altman plot of intake of the 8 individual herbs and spices in grams per month (product of frequency of intake and portion size), a unit which we have not presented in the manuscript to avoid to many different estimates. The Bland Altman plots
using this unit show the same tendencies as observed and using the unit frequency in times/month (described above).

We also looked at the Bland Altman plot for total intake of herbs/spices (in g/person/day). This plot showed a tendency of overestimation of total intake by the FFQ at the higher mean intakes. This plot is now included in the manuscript, please see Figure 1 and lines 152-156 in the manuscript.

A Bland Altman plot occupies much space in an article, thus we have not included all the individual Bland Altman plots in the manuscript. If the referees or editors find it useful, we will include all individual Bland Altman plots in the supplemental file enclosed with the article.

**Specific comment 2**

Are the authors able to elaborate on the main limitation of the study i.e. that restaurant and take-out meals were excluded from the data collection. This is potentially an important omission depending on the nature of the meals e.g. Thai or Indian foods etc have herbs and spices as major ingredients.

Our response: Yes, we recognise that the exclusion of restaurant and take-out meals are sources of error that may contribute to underestimate total intake of herbs and spices. However, we found that it would be difficult for the participants to find out about the content of herbs and spices in restaurant and take-out meals, thus we did not include these meals in the study. Please see lines 239-243 for discussion of this limitation.

**Minor comment**

Do the authors have data on salt intake? Is it related to intake of herbs and spices?

Our response: No, unfortunately our food and nutrient database has limited data on salt in food, and salt was not asked for specifically in the FFQ, thus salt intake is not included in the study.

**Report from reviewer 2 David Jacobs**

**Major compulsory revision 1**

Abstract: I don’t understand the sentence, “Portion sizes showed higher agreement among consumers than in the whole study population.” Wouldn’t nonconsumers have zero portion size?

Our response: we have removed this sentence from the manuscript (line 44).
Major compulsory revision 2

Is “consumers” defined by FFQ, HSR or both? How many people endorsed the spice in one, but not the other, questionnaire?

Our response: Consumers are defined by the FFQ. Please see line 137 for clarification. The number of people (in percent) who endorsed the spice/herb in one of the methods but not the other: pepper 8%; fresh basil and cinnamon/cassia 32%; taco spice mix 35%; barbeque spice mix and dry basil 45%, curry spice mix 46% and dry oregano 51%.

Major compulsory revision 3

P5, reference to peppermint: Peppermint is part of a larger mint family. Do the authors mean specifically peppermint or do they mean mint more generally?

Our response: In the FFQ we ask for the use of “fresh peppermint”. In Norwegian food stores you can by the fresh herb commonly named “Mynte”, or “Peppermynte”. This is the herb Peppermint (\textit{Mentha \times piperita}, also known as \textit{M. balsamea} Wild) which is, according to the Oxford Companion to Food (second edition), a hybrid mint, a cross between the watermint (\textit{mentha acquatica}) and spearmint (\textit{Mentha spicata}). The plant is indigenous to Europe, and widespread in cultivation throughout all regions of the world.

Major compulsory revision 4

Using a little more space, you could have presented the level of agreement of endorsement among the remaining spices, even though they were rarely used. These data would also be of interest, since the base for herb and spice eating is low

Our response: as requested we have added this data, for the herbs and spices not included in tables 1, 2 and 3, in a supplemental table, please see Supplemental file, supplemental Table 1. If the editors or the referee prefer, we may include this table in the main manuscript.

Discretionary revision 1

I don’t have a good sense for the FFQ used. Was it just a heading like “Herbs and Spices”, the individual lines such as “basil, ground or fresh” with response options? Based on the kinds of disagreements between the FFQ and HSR, do the authors have any suggestions for improving the FFQ?

Our response: please see lines 91-105 for clarification

Suggestions for improving the FFQ?

Our response: as only 8 of the 27 herbs and spices we asked about in the FFQ were consumed by more than 1/3 of the study population we consider including only these 8 herbs and spices in future revisions of the FFQ. In addition, the portions size estimates seem to be more difficult to estimate than frequency of use, and can be improved. We are discussing other units to estimate portion sizes, instead of in teaspoons. For example fresh basil may be easier to estimate in number of leaves used than in teaspoons. Also, other spices, such as cinnamon
and barbeque spice are often poured directly on the food from the container and not measured in teaspoons before it is used. We might try to develop some kind of helping tool for estimation of portion sizes, (i.e. pictures).

Also we identified that the mix of different herbs called Pizza spice blend was a much often used spice registered in the HSR, so we should include a question about this spice blend in future revisions of the FFQ.

Report from reviewer 3 Janice Stuff
The authors propose a relatively important research question on measurement of herb and spices intake. However, the methods, statistics and discussion are lacking some important scientific details to clarify the study procedures.

Major compulsory revision 1
Consider presenting in title, abstract and in paper the concept of a ‘validation study’ between FFQ and HSR.

Our response: Since this is a comparison of data from two dietary assessment methods that both have inherent errors, and none of them measure absolute true intake, we have chosen to use the term evaluation study instead of validation study. We have elaborated some on this in the abstract, background section; please see lines 29-31. We have also expanded the description of the concept of comparing data from test and reference methods in the Background section; please see lines 73-75.

Major compulsory revision 2
In abstract emphasize the FFQ had directed questions on herb and spices use; the HSR was only for herbs and spices.

Our response; please see lines 34-36 for clarification in the Abstract.

Major compulsory revision 3
Likewise, under method section emphasize the unique features added to each dietary methodology that targeted intakes of herbs and spices.

Our response: please see lines 91-105 for the design of questions about herbs and spices in the FFQ, and lines 114-120 for design of the herb and spice records.

Major compulsory revision 4
Typically, a FFQ is administered for estimating intakes for 1 year or more. Here, was the FFQ for only 1 month and the same month as the HSR?
Our response: the FFQ was administered for the preceding year and not for one month. Please see line 88 in the method section. We have also included a sentence in the discussion section about the implications of this difference in time period covered by the two methods, please see lines 244-246.

**Major compulsory revision 5**

Methods – the term ‘eating occasion’ is not clear. Typically the frequencies are reporting for all meals per day? How is the eating different and determined?

Our response: the consumption of herbs and spices were in the HSR recorded in teaspoons if used during a day. We were therefore able to calculate the portion sizes for each time the item was consumed. Thus ‘eating occasion’ is defined as any meal in which the herb/spice in question was used, independent of day, during the 28 days of recording. Likewise, the frequency was registered and analyzed as times used per month, independent of day. Thus, if a participant used chili peppers twice during one day only in the 28 days of recording, the frequency would be 2 times per month.

In the FFQ, we asked for habitual portion size per meal. Thus we could compare the portion sizes estimated from the FFQ and the HSR, per eating occasion instead of per day.

Ideally we would have estimated the intake as g/person/day as we usually do with other food items and beverages, but in this case the amounts used were so small and the frequencies in many cases very low, so the g/person/day unit was not an adequate unit to use.

We have added information about the definition of ‘eating occasion’ in the Methods section, please see lines 128-129.

**Major compulsory revision 6**

KBS software, page 5, more detail and citation needed.

Our response: this has been added, please see lines 108-111.

**Major compulsory revision 7**

Statistics. Again term eating occasion is unclear and undefined. What considerations for normality, non-normality were made in analyses? Are correlations Spearman or Pearson? For categorical agreement Kappa statistics can be computed. Asterisks in table are not footnoted and referenced.

Power calculations for agreement, were these prepared?

Our response: please see Major compulsory revision 5 for the definition of eating occasion.
All intakes of herbs and spices except black dried pepper (piper nigrum) showed skewed distribution, thus a non-parametric test (Wilcoxon signed-rank test) was used for testing differences between methods. Although the data showed a skewed distribution we presented mean values of frequency of intake and portion sizes. We have now added the median values also, please see Tables 1 and 2 for clarification.

Correlations were all Spearman correlations (denoted as $r_s$ in the tables). Please see line 135 in the statistics section.

Kappa statistics have been performed on categorical agreement, please see Table 3 and line 192.

All asterixs have been changed to letters and are now footnoted.

Power calculations for agreement were not presented in the paper. Sample size calculation based on agreement between methods in our study shows that with our sample size ($n=146$), a significance level of 5% and power of 90%, we should be able to detect correlations of 0.26 and above (Sampling, study size and power, in “Design Concepts in Nutritional Epidemiology”, Margetts and Nelson, 2nd edition, 1996).

**Major compulsory revision 8**

Page 9, statement that there was an overestimation of use. Could this be attributed to the wider time frame of the FFQ than the one month for HSR? Or was the FFQ targeted for r1 month?

Our response: yes, this could be attributed to the wider time frame of the FFQ. Please see lines 244-246 in the discussion.

**Major compulsory revision 9**

Statements of “good” correlations should be defined apriori by cut points or standards of reasonable agreement.

Our response: in our use of the terminology we have set correlations above 0.5 as good and correlations between 0.3 and 0.5 as fair. This is based on common use of correlation in studies evaluating dietary assessment methods and is now included in the statistics section, line 137. For the kappa statistics used in Table 3 we use the definition assigned to kappa statistics for fair, moderate, good and excellent agreement (Medical Statistics from Scratch, David Bowers, John Wiley and Sons, 2008).

**Major compulsory revision 10**
As already mentioned, conclusions, define ‘good’ agreement

Our response: please see Major compulsory revision 9.

**Major compulsory revision 11**

Table 1 and 2 explain footnote for *.

Our response: the asterixs are now replaced by a and b, which are explained in the footnotes.

**Major compulsory revision 12**

Table 3 compute kappa statistic

Our response: we have now computed Kappa statistics on the agreement between categories in Table 3, and the values are included in the last column.