Reviewer’s report

Title: The added value of Food Frequency Questionnaire (FFQ) information to estimate the usual food intake based on repeated 24-hour recalls

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Reviewer: Jayne Hutchinson

Reviewer's report:

24-hour recalls to assess dietary intake are increasingly being used, and respondents are usually asked to provide only two days intake to reduce the burden on them. This method, however, produces wide within-person day-to-day variations and has limitations for providing good estimates of usual intake, particularly of foods where intake is episodic in nature. Increasingly the dietary data gathered in this way is modelled further using programs such as SPADE to produce intake estimates that are closer to usual intakes. The current study evaluates whether an integrated approach using information about the frequency of intake collected by Food Frequency Questionnaire (FFQ) in addition to the 24hr data can produce intake estimates that are closer to usual intakes than if the FFQ data is not used. In particular, information about never-consumers of foods from the FFQ is used.

This is an important area to study, however the manuscript of the current study is confusing and difficult to follow for a variety of reasons, and needs to be re-written more clearly for those who are not very familiar with modelling usual food intake, as well as for those who are familiar with it.

Firstly, it is difficult to follow the different modelling scenarios: I was unsure how many simulation models there were and sometimes I was confused about which of the models the authors were referring to, especially since the names of the different models were similar and I believe the authors did not always refer to the same model every time with the same name.

Near the beginning of the methods section, I suggest adding a flow chart/diagram of the different models/simulations (and the original BNFC2004 data) giving them a name which should be used throughout the manuscript and state whether they include consumers only, whole population, and are simulated with or without FFQ information on never-consumers, etc. Additionally a brief description of the different models could be added near that.

* Lines 205-206: At the bottom of the first paragraph of the section 'Simulation of consumers only' is the sentence "The usual intake distributions obtained from the original BNFCS2004 data should be called 'the original BNFCS2004". However, it is not clear whether any modelling/simulation was done to produce 'the original BNFCS2004'; if not, then to reduce confusion I suggest that sentence be included earlier in methods. Additionally, if no
modelling was involved to produce 'the original BNFCS2004' then the intake distributions are unlikely to reflect 'usual' intake. If not I suggest omitting the word 'usual' when talking about the distribution of 'the original BNFCS2004'. Alternatively, if usual intake has been estimated accounting for within-person variations, please make this clear(er).

Secondly, some parts of the manuscript are difficult to follow because of the sometimes awkward and unclear use of English. Ideally the manuscript needs proof reading by a first language English speaker who understands the methods.

Also

* Generally avoid the use of 'one' followed by a verb in articles and reports (e.g. lines 378, 390, 392, 438, 484, 488, 521, 529 and conclusion of abstract).

* Please avoid the use of 'in case' (e.g. line 392), instead it may be more appropriate to use 'when'.

* Line 102: Instead of using the term 'blow-up' a more appropriate word could be used .e.g. widen

* Line 372: Do you mean 'somewhat' instead of 'somehow'? Or perhaps it may be better to delete 'somehow'.

* Line 71: delete 'and this'

Lines 111-112 and 119-120: I assume some of the never-consumers may have consumed the foods at some point in their lives, and they are not 'never-ever-consumers'. Therefore, in the definition of never-consumers please mention the time frame of the FFQ that provides the never-consumer information, and the specific time frame of never-consumers in the BNFCS. For instance did the FFQ used in the BNFCS ask whether the respondents have never consumed a food within the last 12 months?

Lines 180-184 and Table 1: A criteria for selecting the food items for modelling was they needed to have different proportions of never-consumers. Table 1 shows that the percentage of never-consumers for 2 of the 3 foods selected (Water and Cheese) are in fact very similar and very low (2% and 5% weighted). I think it would have been useful and interesting to use the FFQ never-consumers data to model the usual distributions of other foods that had similar or higher percentages of never-consumers than that of fat spread.

Line 184: It may be useful to briefly explain 'convergence' problems.
Line 296: Why does this sentence state that the simulated "true" usual intake distribution does not require any modelling?

Line 419: I don't think Goedhart et al. [6] were the first to perform a large simulation study as the authors have stated, I think they were the first to use a number of methods and programs to simulate and compare intake of episodically consumed foods, and to include never-consumer information from an FFQ. Please correct.

Lines 337-338: The tables 2 and 3 only include one of the 4 simulations undertaken for each of the 3 foods. Would it be more appropriate to include the mean and/or the range of these 4 simulations?

Tables 2 and 3: In the tables please state the units used.

Figures: More information is needed in the figures so that they are understandable without having to read the rest of the manuscript. For instance a title is need for figures A, B C to distinguish which is Water, Cheese and Fat spread. Also a title is needed on each Y axis.

Discussion, limitation section: Modelling usual intake appears to be very involved and time consuming, requiring more expertise than is needed for normal analyses of datasets; potentially this limits the amount and type of analyses that can be produced from datasets that have only 2 days of food intake.

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