Reviewer’s report

Title: Changes in food intake patterns during 2000-2007 and 2008-2016 in the population-based prospective Northern Sweden Diet Database

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Reviewer: Rebecca Leech

Reviewer’s report:

This paper describes dietary patterns, derived using latent class analysis, in a very large population-based sample of northern Swedish men and women spanning across two 8-year time-periods. While the dietary patterns are based on dietary information collected via a 64-item food frequency questionnaire, the examination of the dietary patterns over time and their associations with sociodemographic and health behaviour characteristics provide important insights into shifts in the patterning of food intake in this population and the identification of population subgroups with poorer dietary habits. Overall, this study is well-written and the analysis thoroughly conducted; I only have a minor comments for the authors.

Introduction

Lines 76-78: "Further work is needed to identify pockets in the population…” It is not clear why there is this gap in knowledge, and how the present study plans to address it. Numerous dietary pattern studies exist in the literature - what makes this study different (apart from the repeated measures and large study sample)? I think there is an opportunity here to emphasise the novelty of the approach taken to analyse the dietary patterns. Latent class analysis (LCA) has been rarely applied in nutrition research, and has a number of statistical advantages over the more commonly used cluster analysis. LCA is also a "person-centred" approach, which is in contrast to the "variable-centred" approach for extracting dietary patterns (e.g. PCA - the method most commonly applied in dietary pattern research to date). A person-centred approach identifies groups of people who have dietary behaviours in common which may be more useful for identifying at risk population groups. In summary, I would like to see the introduction better emphasise the novelty of the present study, with reference to the statistical approaches used to capture dietary patterns.

Methods

Line 101-109: "Over the years, residents may have participated more than once". Please clarify how many of the same participants completed the assessments during both 8-year time periods.

Line 155-156: Please clarify how the participants were classified into the different physical activity categories. For example, what are the cut-offs for being allocated a physical activity
category based on the participants' occupational and leisure time physical activity? Were the cut-offs based on time and days being active or intensity of activity or both?

Line 177: Continuous indicators were used in the Latent Class Analysis (often referred to as Latent Profile analysis when continuous data are used). Please clarify the nature of the data (e.g. whether it had a skewed distribution) and whether LCA is equipped to handle skewed dietary data.

Line 180-182: The authors have used a number of model fit indices to determine the number of classes (or clusters) present in the data. For transparency and reproducibility, I would like to see this information presented in a supplementary table. Also, please clarify if likelihood ratio tests were used (e.g. Lo-Mendell-Rubin LRT or Bootstrap LRT) to compare classes and, if so, please include this information in the table, and, if not, please justify why.

Line 191: It is not fully clear to me why this sensitivity analysis was conducted using PCA (a variable centred statistical approach). If the authors wanted to examine the reproducibility of the dietary patterns extracted using LCA, they could have repeated the LCA on a random split sample. If the sensitivity analysis was done to see if the type of patterns extracted were similar across different methods, then this needs to be clearer. Again, this highlights to me the need for more background information on the methods used to extract dietary patterns and the novelty of the approach taken in the study (as suggested in my earlier comment).

Figures 2-5: The clarity of the figures could be improved as they are difficult to read.

Tables 3 and 4: Among women, the 'pulses and tea' cluster and 'soda and sweets' cluster represent <2% of the study population. These clusters could perhaps be considered as "outlier" clusters. Please discuss whether understanding these outlier clusters are useful from a public health perspective. As suggested previously, please also provide supporting data showing the model fit indices for the cluster solutions ranging from 2 to 7.

Results

Lines 249-251: The "Healthy sandwiches" cluster included consumption of "cold cuts" (meat, sausage and liverwurst). Please clarify if cold cuts includes processed sandwich meats. If so, and given the WCRF recommendations to limit intakes of processed meats, then please reconsider the label and descriptions applied to this cluster.

Discussion

Lines 342. Please provide an overview of the Nordic recommendations on food habits somewhere earlier in the manuscript (e.g. introduction). This information will help the reader to interpret this statement about the study's findings and add needed context for understanding the shift in food intakes over time. Please also indicate if the Nordic recommendations have changed at all during the time-period under study.
General discussion point: Is the shift in dietary intake towards higher consumption of high-fat dairy and high-fat dairy and vegetable oil spreads really of concern? That is, are the types of fats in these products actually harmful to cardiovascular health or is it merely the extra calories in the high fat foods that are of concern, given the current obesity prevalence? Please discuss the evidence (including any recent evidence that may not be captured in the current Nordic dietary guidelines) in relation to the dietary advice for intakes these foods.

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