Reviewer’s report

Title: More to Gain: Dietary Energy Density is Related to Smoking Status in US Adults

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Reviewer: Doug Manuel

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More to Gain: Dietary Energy Density is Related to Smoking Status in US Adults

Overall

This paper examines evaluate the correlation of smoking and diet quality in relation to other risk factors, using NHANES.

The population importance of this paper is large. Smoking cessation is the most important health intervention for smokers. Weight gain during and following smoking cessation is an relevant issue.

Major comments

1) Much of the paper is about antioxidant vitamins, rather than energy density. It seems there are two options:
   a. Focus the paper on energy density.
   b. Change to title and objectives to include an objective on antioxidant vitamins.

It could be argued, as the authors do, that antioxidants are also important context for energy density and smoking. However, seems off focus given the title and stated objectives. The argument for antioxidant focus could be more clearly presented with more supporting references.

In terms of sub-group analyses a more important objective, rather than antioxidants, is type of energy dense food. Which foods and drinks, if any, contribute to the findings?

2) The role of antioxidants and smoking was well referenced. There is controversy regarding the role of antioxidants and lung/other cancers.
   a. Are there not many negative studies of antioxidants and cancer, including negative/harmful RCTs? What do the systematic reviews indicate?
b. Are there not more important food/nutrients that are related to cancer, such as fruit and vegetable consumption?

3) Study reproducibility. There was not a fulsome description of the study methods.
   a. Can the authors confirm that a research can follow the steps outlined and reproduce the findings?
   b. Was there any additional data cleaning, adjustment for measurement error, etc? See minor comments #5, 6, 9, 20 and others.
   c. Does the study meet STROBE criteria and/or other relevant reporting guidelines?

4) There is the notion of diet quality being defined solely through "energy density" as diet quality represents a much more complex interplay of foods and nutrients, their amount, frequency and the proportion by which they are consumed. Energy density may still be of value, but consideration can be given to reflect focus the objective, methods and results on energy density, rather than the broader definition of "diet pattern".

Minor comments:

1) Lines 4-6: "Diet quality in relation to risk factors associated with poor health" - this is unnecessary, can just say energy density (ED)

2) Line 45: change 'and' to 'an'

3) Line 79: See Major comment #4. Although there is a high correlation between the two concepts, there are higher calorie components in an overall dietary pattern that are known indicators of diet quality (e.g., olive oil in Mediterranean diet, whole grains for CVD prevention, etc.)

4) Line 99: General statements regarding "disease risk" could be more specified.

5) Line 137-139: Confusing. Also how did you consider carbonated drinks ED? And in line 150: If they were a covariate, did you include tea, coffee and water for example? What is the rationale for adjusting one energy density for the other?

6) Line 140: Is this analysis focused on day 1 of diet recall only?

7) Line 141: n=5535 in parentheses

8) Lines 154-161: Helpful to include P-values for all comparisons.
9) Table 2: No adjustment for energy/day is done and hence values are confounded by total energy intake.

10) Lines 165-168: too strong a conclusion (also wrong place for interpretation of results). It can only be said that being a current smoker is associated with higher ED vs. non-smoking. Authors also say any amount of smoking is associated with poor diet when in the next sentence; former smokers have comparable diet to non-smokers who are assumed to have better diet?

11) Line 168: remove mention of diet quality and better diets… change to ED


13) Lines 169-171: explain how this result was derived, no supporting analyses are presented

14) Line 174: P-value for vitamin A = 0.0003, but stated as P<0.0001 in Table 2.

15) Line 175: P-value for b-carotene does not match Table 2.

16) Line 182: confusing to state it as "inverse" relationship (what is the inverse of smoking status? It is not a binary variable)

17) Line 209: how accurate is ED a marker of overall diet, if authors' reference 31 reported association between smoking and overall diet but not smoking and ED? Important throughout paper not to conflate ED with overall diet quality as nutrition science literature does not always support this notion as noted above

18) Line 217: change maker to marker

19) Line 225: unclear

20) Line 229-231: no mention in methods of how usual intake was estimated. Were two recalls averaged? if yes then not a good estimation of usual dietary intake.

21) Line 234-238: would need SE of former smokers to say this

22) Table 1: statistical significance is for which comparisons?

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.
Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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