Author's response to reviews

Title: Coffee and tea consumption in relation to inflammation and basal glucose metabolism in a multi-ethnic Asian population: a cross-sectional study

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Author's response to reviews: see over
Dear Nutrition Journal Editors,

We thank you for considering our manuscript “Coffee and tea consumption in relation to inflammation and basal glucose metabolism in a multi-ethnic Asian population: a cross-sectional study” Ref:1889835141513189 for publication in Nutrition Journal.

We would also like to thank the reviewers for their valuable comments and suggestions. We have provided a point-by-point response to their concerns below. Based on their suggestions, we have modified the results section of the manuscript and added a table (supplementary table -2). We have also corrected some typographical errors in the article. Changes made to the original manuscript are marked as “tracked changes” in the manuscript and are listed below.

We hope the revised manuscript is considered suitable for publication in Nutrition Journal.

Looking forward to your response,

Sincerely,

Study authors

Salome A. Rebello, Cynthia H. Chen, Nasheen Naidoo, Wang Xu, Jeannette Lee, Kee Seng Chia, E Shyong Tai and Rob M. van Dam
RESPONSE TO REVIEWERS COMMENTS

Dr. Liisa Hiltunen

Reviewers comment: I have no major revisions to suggest, but, due to the cross-sectional, observational design, which is the main limitation of the study, it does not provide evidence on causalities or mechanisms. Thus, conclusions can only be made on associations.
Response: We acknowledge that due to its cross-sectional nature causality cannot be inferred from this study. This has been previously noted as a study limitation.

Reviewers comment: However, it would be beneficial if the authors could add data on the duration of coffee and tea consumption of the participants. Preceding one month is a very short time for the estimation of stability of dietary intake, which may have changed due to several reasons during earlier years.
Response: We recognize that intake over a one-month period may not be fully reflective of long-term dietary exposure. However, coffee and tea intake are usually considered relatively stable dietary preferences [1, 2]. Also, we excluded participants who may have changed their intake of these beverages in response to life-situations, for instance women who were pregnant or participants who were diagnosed with chronic disease. We also excluded participants who reported having changed their beverage intake.

Reviewer’s comment: Though it is reasonable to limit the highest category of tea consumption to one or more cups per day to avoid too small categories, I also wonder, if the authors found similar results with adding other categories, e.g. three or more cups per day? This could be mentioned in the results section.
Response: Unfortunately, very few people consumed 3 or more cups of tea per day, which makes conducting these analyses less meaningful. These numbers are 32 for green tea, 71 for Oolong tea and 98 for black tea. When we grouped people who consumed 3 or more cups of any type of tea per day we did not observe significant associations between tea consumption and glycemic or inflammatory markers in fully adjusted models. In this cohort associations between tea and metabolic outcomes vary by type of tea, and grouping them together potentially decreases the power to capture these associations. We included these results in the manuscript. (Line 233-238 and supplementary table-2).

Dr. Gang Hu

Reviewer’s comment: Why did you assess the habitual amount of tea consumed by both frequency (< 1 cup/week, 2-6 cups/week, and ≥ 1 cup/day) and quantity for tea net weight (g/day)? Do you have any validity data for tea consumption?
Response: We assessed tea intake by frequency of consumption of each type of tea only. We do not have validity data specifically for coffee or tea consumption. However, other studies that have compared FFQ data to 24-hour dietary instruments have noted excellent correlations (r=0.78 for coffee and r=0.93 for tea) [3] indicating that participants are able to quite accurately recall average number of cups of tea or coffee consumed. Also, intake levels that we observed in this study are fairly similar to those reported by other studies in Singapore. For instance in the
Singaporean Chinese Health Study[4], a cohort study comprising of older Singaporean Chinese, 71% reported consuming ≥ 1 cup of coffee on a daily basis and approximately 12% reported consuming black or green tea on a daily basis. In this study, we note about 61% of Chinese consuming coffee on a daily basis, with about 22% reportedly consuming at least 1 cup of black tea and 9% consuming at least 1 cup of green tea.

References

Coffee and tea consumption in relation to inflammation and basal glucose metabolism in a multi-ethnic Asian population: a cross-sectional study

The total participant pool derived from these studies consisted of 11,053 persons, of which 608 were not available (deceased, emigrated, errors in identity number recording) [31].

The HOMA-IR index was computed as fasting plasma glucose mmol/L x fasting plasma insulin (mU/L)/ 22.5 and the HOMA-beta index was computed as 20 x fasting plasma insulin (mU/L) / fasting plasma glucose (mmol/L -3.5)

Few people consumed three or more cups of a given tea-type (N = 32, 71 and 98 for green, Oolong and black tea respectively), making it less meaningful to look at higher categories of tea intake. When we summed tea intake across the different types of tea, we found no significant associations between tea consumption and metabolic markers (supplementary table-2).

Supplementary table- 2: Geometric means (95% CI) of glycemic and inflammatory parameters by categories of total tea consumption

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Never or rarely</th>
<th>&lt;1 cup per day</th>
<th>1 to &lt;3 cup(s) per day</th>
<th>≥3 cups per day</th>
<th>P trend b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fasting plasma glucose (mmol/L)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>4.87 (4.83 - 4.91)</td>
<td>4.83 (4.79 - 4.86)</td>
<td>4.83 (4.8 - 4.86)</td>
<td>4.85 (4.79 - 4.91)</td>
<td>0.660</td>
</tr>
<tr>
<td>Model-2</td>
<td>4.78 (4.72 - 4.85)</td>
<td>4.75 (4.69 - 4.81)</td>
<td>4.75 (4.69 - 4.81)</td>
<td>4.75 (4.68 - 4.83)</td>
<td>0.360</td>
</tr>
<tr>
<td><strong>HOMA-IR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>1.55 (1.48 - 1.62)</td>
<td>1.5 (1.44 - 1.57)</td>
<td>1.58 (1.53 - 1.64)</td>
<td>1.67 (1.56 - 1.78)</td>
<td>0.015</td>
</tr>
<tr>
<td>Model-2</td>
<td>1.42 (1.33 - 1.52)</td>
<td>1.39 (1.3 - 1.48)</td>
<td>1.42 (1.34 - 1.51)</td>
<td>1.42 (1.31 - 1.53)</td>
<td>0.796</td>
</tr>
<tr>
<td><strong>HOMA-beta</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>101.09 (97.51 - 104.8)</td>
<td>103.22 (99.53 - 107.05)</td>
<td>103.57 (100.52 - 106.7)</td>
<td>103.57 (98.08 - 109.37)</td>
<td>0.445</td>
</tr>
<tr>
<td>Model-2</td>
<td>103.94 (97.39 - 110.93)</td>
<td>105.89 (99.31 - 112.91)</td>
<td>105.87 (99.62 - 112.52)</td>
<td>104.96 (97.24 - 113.29)</td>
<td>0.800</td>
</tr>
<tr>
<td><strong>HbA1c %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>5.8 (5.76 - 5.83)</td>
<td>5.76 (5.73 - 5.8)</td>
<td>5.78 (5.75 - 5.81)</td>
<td>5.81 (5.76 - 5.87)</td>
<td>0.411</td>
</tr>
<tr>
<td>Model-2</td>
<td>5.74 (5.68 - 5.8)</td>
<td>5.72 (5.66 - 5.78)</td>
<td>5.72 (5.66 - 5.78)</td>
<td>5.74 (5.67 - 5.81)</td>
<td>0.884</td>
</tr>
<tr>
<td><strong>Adiponectin : high-molecular weight (µg/ml)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>1.04 (0.99 - 1.1)</td>
<td>1.04 (0.99 - 1.09)</td>
<td>1.02 (0.98 - 1.06)</td>
<td>0.96 (0.89 - 1.03)</td>
<td>0.039</td>
</tr>
<tr>
<td>Model-2</td>
<td>1.01 (0.93 - 1.1)</td>
<td>1.01 (0.93 - 1.09)</td>
<td>1.02 (0.94 - 1.1)</td>
<td>0.99 (0.9 - 1.09)</td>
<td>0.650</td>
</tr>
<tr>
<td><strong>CRP (mg/L)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model-1</td>
<td>1.53 (1.42 - 1.65)</td>
<td>1.42 (1.31 - 1.53)</td>
<td>1.49 (1.4 - 1.58)</td>
<td>1.55 (1.39 - 1.74)</td>
<td>0.590</td>
</tr>
<tr>
<td>Model-2</td>
<td>1.41 (1.25 - 1.59)</td>
<td>1.32 (1.17 - 1.48)</td>
<td>1.36 (1.21 - 1.52)</td>
<td>1.31 (1.14 - 1.51)</td>
<td><strong>0.388</strong></td>
</tr>
</tbody>
</table>
To compute total weekly tea consumption, each category was assigned a median value as follows: never or rarely (0), < 1 cup per week (0.5), More than 1 cup per week but less than 1 cup per day (4), 1-2 cups per day (10.5), 3-5 cups per day (28), 6-9 cups per day (52.5) and 10 or more cups per day (70). This was added for the 3 types of tea. HOMA-IR, homeostatic model assessment-insulin resistance; HOMA-beta, homeostatic model assessment-beta cell function; CRP, C-reactive protein. Numbers of participants differ across outcomes because participants with outlier values (response values > 4 SD from mean) were excluded. Numbers were as follows: fasting plasma glucose: 1050, 1085, 1515, 424; HOMA-IR: 1057, 1093, 1531, 427; HOMA-beta: 1057, 1090, 1527, 421; HbA1c: 849, 887, 1246, 371; HMW adiponectin: 1028, 1061, 1508, 420; and CRP: 1022, 1054, 1502, 417.

b P-values were obtained from multiple linear regression models with median cups of tea per week (0, 4, 10.5, 28) as predictors and log transformed parameters as dependent variables.

c Model 1: adjusted for age (years), sex and ethnicity (Chinese, Malay, Indian).

Model 2: adjusted for Model 1 covariates (above) and BMI (kg/m²), physical activity level (kcal/week), education level (primary, secondary, polytechnic/diploma and university), alcohol level (non-drinkers, <1 serving/day, and ≥ 1 serving/day), cigarette smoking (never-smokers, ex-smokers, current smokers <10 cigarettes /d, and current smokers ≥ 10 cigarettes/d), history of dyslipidemia (yes/no), history of hypertension (yes/no), and dietary confounders i.e. energy intake (kcal), fiber (per 1000 kcal), cholesterol (per 1000 kcal), PUFA (% energy), MUFA (% energy), SFA (% energy) and coffee (never/rarely, < 1 cup per day, 1-2 cup(s) per day, ≥ 3 cups /day). HOMA-beta models were further adjusted for HOMA-IR.