Reply to Veronese and Smith: Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies

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To the Editor:

We thank Nicola Veronese and Lee Smith for their comments on our recent paper [1]. The letter is broadly supportive but the claim that our paper has methodological limitations adds little to the extensive description of the same in our original paper. Veronese and Smith offer four shortcomings of our work.

The first concerns the pooled estimate we provided from both cross-sectional and longitudinally designed studies. We agree that such estimates should be treated separately and we did this in the original manuscript (Figures 1, 2, 3 and 4). Given that these studies are all observational, our additional provision of an overall pooled estimate is reasonable and informative.

On the second point, we of course recognise that hazard ratios are time dependent and are therefore computed differently to odds ratios. They are, however, effectively interchangeable when the outcome is relatively rare (rate in the reference group <10%) as it is in almost all chronic disease epidemiology research. Fundamentally, any such differences in effect estimates, statistically significant or not, are unlikely to change the conclusions regarding an association – here or anywhere.

The authors claim that we did not try to investigate heterogeneity due to the difference in effects based on studies ascertaining clinical depression and those assessing depressive symptoms when, on more careful reading, they would have seen that we did just this (Sensitivity Analyses section p.3 and p.16 of our manuscript) with commentary (p.18).

Lastly, the authors state that our transformation of beta coefficient to log odds ratio – use for only one of the 41 papers included in our review – was inappropriate. Whilst it is true that the example in the paper by Chinn [2] is based on a standardized mean difference, the author defined "effect size" as "a difference in means or a regression coefficient": this conversion can be applied to a standardized beta coefficient too, comparing depressive symptoms across categories of dietary patterns, as done in a previous study[3].

To conclude, we think most, perhaps all, of the limitations which led Veronese and Smith to postulate that our article's shortcomings 'preclude any definitive answer on this topic' were already addressed in our original paper. Given the strength of the methodology, we believe, instead, that the meta-analysis provides good evidence that adherence to an overall healthy diet is associated with a lower risk of depression.

Conflict of interest: The authors declare that they have no conflict of interest.

References

1 Lassale, C., Batty, G. D., Baghdadli, A., Jacka, F., Sanchez-Villegas, A., Kivimaki, M. *et al.* Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies. *Mol Psychiatry* **24**, 965-986, doi:10.1038/s41380-018-0237-8 (2019).

2 Chinn, S. A simple method for converting an odds ratio to effect size for use in meta-analysis. *Stat Med* **19**, 3127-3131 (2000).

3 Lai, J. S., Hiles, S., Bisquera, A., Hure, A. J., McEvoy, M., Attia, J. A systematic review and meta-analysis of dietary patterns and depression in community-dwelling adults. *Am J Clin Nutr* **99**, 181-197, doi:10.3945/ajcn.113.069880 (2014).