Response to letter by Campbell et al. regarding the results of the COSTICK trial

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We thank Cambpell et al. for taking the time to read our trial report[1] and pleased to respond to their comments and queries.[2]

Cambpell et al. cite the SODIUM-HF trial as evidence to support the feasibility of reducing sodium intake below 2.0 g/day (salt intake of below 5 g/day).[3] However, the SODIUM-HF trial measured sodium intake using 3-day food records, which may underestimate sodium intake (compared to 24-h urine assessments). In the COSTICK trial, participants reported a change in their discretionary use of salt, which did not translate into reductions in 24-h urinary excretion, possibly related to compensatory changes in non-discretionary salt intake. Moreover, dietary intake in patients with heart failure is not expected to be representative of the general population. Patients with heart failure are often heavily counselled to reduce dietary sodium intake as part of routine clinical care, and, those with more advanced disease are likely to have a lower caloric intake and, by extension, lower sodium intake. In contrast, our trials included a population with less morbidity and a more heterogenous population of free-living adults, with high quality diets (as evidenced by high diet quality scores and high potassium excretion).

In measuring 24-h sodium excretion, which was not a primary outcome of our trial, we chose a threshold of at least 50% predicted creatinine clearance for inclusion in our sensitivity analysis. Our choice was based on a literature review on the accuracy and usefulness of different methods to assess the completeness of 24 h urine, including the systematic review[4] cited in the letter by Cambpell et al. We selected a cut-off of 50% (observed:predicted creatinine) for pragmatic reasons, as we were keen to include a larger sample size in our analysis, while considering the purpose of the measurement in the setting of a randomised controlled trial. Other studies report a greater sensitivity using a cut-off of 70%.[4] The purpose of estimating 24-h urine excretion of sodium, in a parallel randomized controlled trial, is primarily to gain an estimate of mean change in sodium excretion between groups, unlike an observational research study designed to estimate mean intake in a population. In the case of randomised controlled trials, the measurement error incurred will be distributed equally between treatment groups, thereby providing a comparative estimate of relative change. In response to this comment, we have completed an analysis confined to participants with 24 h collections with observed: predicted creatinine ratios $\geq$0.7; the mean sodium intake in the intervention group (n = 67) from 3.70 ± 1.43 g/day to 3.41 ± 1.57 g/day, over two years, and increased from 3.27 ± 1.26 to 3.32 ± 1.30 g/day in the usual care group (n = 61), with an adjusted mean difference of −0.22 (95% CI −0.66 to 0.21)g/day (p = 0.31, n = 128). Therefore, our conclusions are unchanged by the analytical approach employed.

Cambpell et al. reference a meta-analysis of randomized controlled trials of sodium reduction trials reporting a mean reduction of sodium intake from 3.65 g/day to 2.69 g/day. However, the majority of clinical trials included were short-term in duration, and we provide a detailed discussion of our findings in the context of other longer-term trials. While no long-term trial has achieved sustained low sodium intake, extended observational follow-up of the Trials of Hypertension Prevent (TOHP) suggests that reducing intake, within a population with moderate intake, may be associated with reduced cardiovascular disease.[5] We agree with Cambpell et al. that 'it is difficult for individuals to sustain lower salt intake long-term', which is a primary conclusion of our trial. The reasons underlying the challenge with reducing sodium intake to sustained low levels is controversial, and may relate to the food environment, but may also relate to physiological drivers related to salt thirst.[6] The inability to sustain low sodium intake raises a practical issue of whether guidelines should recommend an individual-level target that is considered unfeasible.

Contributors

AS and MOD drafted and finalised this letter in response to a letter received by the journal. The authors (AS and MOD) access and

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verified the underlying data for the statistical analysis presented in this letter.

Declaration of interests

We declare no competing interests.

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