Reviewer's report

Title: The influence of calcium and magnesium in drinking water and diet on cardiovascular risk factors in individuals living in hard and soft water areas with differences in cardiovascular mortality.

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Reviewer: Petra Graham

Level of interest: A paper whose findings are important to those with closely related research interests

Advice on publication: Unable to decide on acceptance or rejection until the authors have responded to the compulsory revisions

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"Calcium and magnesium in drinking water and diet as cardiovascular risk factors in individuals living in hard and soft water areas with differences in cardiovascular mortality. A cohort study."

The authors have made substantial changes to the paper and have addressed many of the suggestions outlined in my previous review. However, there are still some important points that need to be addressed in light of the revisions.

Discretionary revisions:

There are still some typographical and grammatical errors, for example "in cidence" on page 3, "Al" on page 5 and "bear" on page 9. Please recheck the paper carefully.

Compulsory revisions:

The third paragraph of the background describes previous studies showing correlations between water and dietary magnesium. Are these correlations positive or negative?

Methods section:

In the methods section the authors describe that 67 subjects received muscle biopsy. How were these subjects chosen from among the 207 study participants? Why weren't all of the 207 subjects chosen? Was everyone asked to participate in the biopsy and only 67 agreed? It is important to make this clear.

Figure 1 requires a caption and the units of the axis labels need to agree with the results reported (i.e. they should be in mmol/l).
How was the difference in the ratios of Mg/Ca tested?

Tables 5a and 5b do not present their results by sex. It is necessary to either report the results of the tables as they are or to add the results for sex into the table.

Table 7 needs an explanation of the row labels. The authors could create a footnote saying that "S-" means serum and so on. All tables should be self-explanatory independent of the text in the manuscript.

Results:

The results would be easier to read if written in a format such as: “Table 3 shows...” Sometimes, because of new paragraphs, it is not clear (unless the reader looks at the tables) which Table the results refer to. This is done, for example, in the first sentence on page 8.

The results for diabetes in the first sentence on page 8 appear to be repeated in the second sentence.

Where linear regression analysis is used were the regression assumptions met? The final regression analysis, in which a response variable from the previous model is used as an explanatory variable in the current model, should be removed as it is not really appropriate. Also, the percentage of variation the response variable explained by other variables indicates poor model fit (the percentages are quite low).

Discussion:

The discussion on the lower half of page 11 simply repeats the results. For each sentence from "There was a significant correlation between s-magnesium..." onwards the authors should guide readers in the interpretation of these results. What do these results imply medically? The authors also need to concede for each point concerning correlations that these correlations, although significantly more than zero, are indicative of weak correlation at best.

The discussion on the regression analyses is not really appropriate since interactions are not formally investigated. It may be more reasonable for the authors to simply suggest the possibility of complex relationships existing.

Conclusion:

The conclusion should also concede that the results in the paper show only weak correlation at best. The regression analyses did not look at cardiovascular mortality or region so the authors cannot make conclusions about those features, they can really only suggest that complex relationships may exist that were not revealed by these analyses.

**Competing interests:**

None declared.