Author's response to reviews

Title: Inequalities in public water supply fluoridation in Brazil: an ecological study

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Inequalities in public water supply fluoridation in Brazil: an ecological study
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Samuel J Moyses

We wish to express our thanks for the constructive suggestions from
the referees. We have modified the MS as suggested. Additionally, we would note
that we have clarified a number of points in the text as suggested by the reviewers.

Reviewer: Marco Aurélio Peres

The authors have provided solid arguments in order to address my
concerns. This manuscripts offers original and relevant contribution to improve our
understanding about inequalities in oral health.

We appreciate all the contributions of this reviewer for improvement
of this MS.

Reviewer: Jason Armfield

General

This manuscript has been much improved by the authors and most of
the points raised in my previous review have been adequately addressed. I commend the authors in this regard. For the record though, the portrait format of the tables was not the problem, it was the fact that they went over multiple pages which makes it very difficult to read. I would also suggest looking at tables in the journal you are submitting to and seeing how neat and easy to read they are. It is wise to copy such a style so that reviewers also find the tables neat and easy to
read. And yes, while the Instructions to Authors do not state the inclusion of page numbers as being required, this is a courtesy to reviewers who otherwise don’t have an easy reference point for listing page-relevant issues it’s easier to say “Page 15” than the third page inclusive past the page where the Discussion heading is. While the Introduction has received some reworking the Methods, Results and Discussion are reproduced faithfully from the early draft so that all the initial problems, which I previously did not identify because I was concentrating on more substantive issues, have been carried over into this revised manuscript. These previous issues plus some new ones are itemized below. I have probably taken far too long to write this review and written way to much, but I can at least hope my comments are useful.

We appreciate the efforts of this Reviewer for the improvement of this MS. The number of pages was added as suggested. Regarding the tables, this item was reviewed and we decided for the elimination of table 3.

Background
Combine paragraphs 1 and 2 as well as paragraphs 3 and 4 (linking with “Indeed, the fluoridation of public water supplies”). There is a tendency in a number of areas of this manuscript to unnecessarily add paragraph breaks where this should not occur. Just as a general pointer, a single sentence does not a paragraph make.
Page 5: “purpose of this study has been to” should be “purpose of this study was to”

We agree with this position. The cited paragraphs was combined as well others along the text.
Methods

Page 5: analyses are quantitative, not studies

We are grateful for this suggestion. It was reviewed and corrected in the main text.

Page 6: Percentage access to mains water and population were from what year?

These data refer to 2000 year. We made this clear in text now. We appreciate the suggestion.

Page 6: A brief description of what variables the HDI includes would be useful.

The following text was added to the main text:

The Human Development Index (HDI) is a powerful instrument created by the United Nations in the beginning of the 1990's (32), that takes into account the multidimensionality of differences in living conditions. The HDI relates to: (a) the population longevity, expressed by life expectancy; (b) adult literacy rate, composed of two variables: the adult literacy rate and combined rate of enrollment in three levels of instruction; and (c) income or Gross National Product (GNP) per capita, expressed in US dollars and adjusted to reflect the purchasing power parity (PPP) among citizen from several countries. This index ranges from 0 to 1, ranking the places into the levels: low (0≤IDH<0.5), medium (0.5≤IDH<0.8) and high human development (0.8=IDH≤1). When it is related to the municipal level, an "M" is added, and this index (HDI-M) is also widely used in studies on quality of life and socioeconomic conditions of populations.
Page 6: Combine paragraphs 3 and 4, both relating to the HDI. I also put the one-line paragraph at the end of the immediately following paragraph.

This item was reviewed and according the suggestion. We appreciated the suggestion.

Page 6: “The size of the population” should be “The size of the municipal population”

We are gratefully for this suggestion. It was reviewed and corrected in the main text.

Page 6: You do not need to introduce the HDI-M as relating to the municipal level in para 4 when you have already stated it as the Municipal Human Development Index in para 2.

We are thankful for this suggestion. This sentence was positioned following the paragraph addressed to HDI.

Page 7: It is generally pass to provide information on the statistics package used to analyse results, unless it’s something unusual or the software analyses the data in a non-standard way. If you really want to keep this one line paragraph at least combine it with the following paragraph (and I used more words describing that than the number of words in the paragraph I was referring to!).

We are grateful for this suggestion. It was reviewed and corrected in the main text.
Page 7: should be “HDI-M values for the years” not “HDI-M values between the years”

Again, we appreciated the suggestion.

Page 7: Reporting the conduct of tests of homogeneity of variance etc. is generally not included in articles.

We are grateful for this suggestion. It was reviewed and corrected in the main text.

Page 7: “dichotomized by their medians” should be “dichotomized using a median split”

We are grateful for this suggestion. It was reviewed and corrected in the main text.

Page 7: You have not previously used the term “micro regions” do you refer here to municipalities?

The term “micro regions” was substituted by “macro regions”. We are sorry for the misspell.

Page 7: I still have a problem with the use of very similar dependent variables. Basically you are performing analyses on the same variable but using 2 categories of that variable for one analysis and 3 categories of the variable for the other analysis. The dichotomised result really adds nothing beyond what you get when
you use three variables. If you’re interested in the cut-point of 1990 as you state in
your response to my earlier review that’s fine. The problem is running a second
analysis with just “Fluoridated/non fluoridated” as your DV.

We are thankful for this suggestion. Based on this we decided to
remove the table 3, since its information can be provided in table 4 without lost of
content from the MS.

Page 7: If the cut point of 1990 is considered important then you should both
mention what effect the laws had and you should raise this point in the Introduction
and most certainly not in the Methods.

We agree with the Reviewer and the sentence regarding this subject
was positioned in introduction.

Page 8: Did you really use simple linear regression for analyses using a
dichotomised DV and where you obtained an OR? It looks to me like this would
have used logistic regression? But you state you use Fisher’s Exact Test and
Linear regression, so where does the OR even come from? Why your choice of
ordinal regression (yeah the categories are ordinal if you view them in terms of
length of time fluoridated, but this is not the sort of variable normally used in this
analysis) rather than multinominal logistic regression?

The choice for the use multinomial logistic regression was based on
previously analysis of the data. The removal of the table 3 helps to elucidate this
question.
Results

Page 8: The student’s t test does not provide means, it is a test of the difference between two means.

We are grateful for highlighting this. It was reviewed and corrected in the main text.

Page 8: What does “the growth in the HDI-M” mean? How has it grown within each of the years? This does not make sense to me.

Considering the HDI-M relates to: (a) the population longevity, expressed by life expectancy; (b) adult literacy rate, composed of two variables: the adult literacy rate and combined rate of enrollment in three levels of instruction; and (c) income or Gross National Product (GNP) per capita, expressed in US dollars and adjusted to reflect the purchasing power parity (PPP) among citizens from several countries, the theoretical rationale in this study assumes that correlation between water fluoridation and HDI-M does not mean that fluoridation was able to promote a better distribution of income, to increase the schooling rate or even life expectancy. Correlation occurs positively, probably because water fluoridation is a consequence of access to basic conditions for promoting health, such as basic sanitation, implementation of treated water and other public health measures. These measures are able to reduce inequalities, consequently promoting a growth in the HDI means.

Page 8: Results para 2 should be past tense not present tense.
We agree with the Reviewer and the sentence regarding this subject was corrected.

Page 8: Again, bottom paragraph should be part of the preceding paragraph, not a separate one. In relation to this paragraph, the relationship as stated cannot be observed because the level of socio-economic disadvantage of the areas is not provided in Table 1.

We appreciate the suggestion. It was corrected on the text. Although it is not explicit on the Table 1, it is possible to see the socio-economic disadvantage of the areas from data provided along in Table 2 and in main text, as in the Background and Discussion.

Page 9, Paragraph 1: There is no evidence of a strong “correlation” in Table 2 because you present a 2 x 2 table testing the association with a Fisher’s Exact test, not a correlation.

We appreciate the correction. The word “correlation” was changed by the word “association” in the main text and Table 2 as well.

Page 9: Saying a variable “lost” its explanatory power is a strange way to word things it didn’t account for a significant amount of the variance in the DV beyond the other IVs in the model.

We appreciate the correction. The cited sentence was removed from the text.
Page 9: Again, sentences are for some reason made into their own paragraphs. As previously described, this item was corrected along the text.

Page 9: rather than say “the outcome in question” just say what it is.

We agree with the Reviewer and the sentence regarding this subject was corrected.

Discussion

Page 10: You need to sort out the significance shown in the bivariates from the non-significant shown in the multivariate analyses. Either you use the bivariates, in which case why run the multivariates, or you use the multivariates and stop saying that variables such as the HDI-M were significant.

We believe that part of this mistake regarding the analysis with multivariates and bivariates could be corrected after the elimination of the Table 3 and all citations to it on the main text.

Page 10: You say that the 1990 development does not appear to have affected this pre-1990 tendency but there do seem to be differences and in any event you never tested this.

The data was analyzed, but the was not inserted in the text. This analysis corroborates the history of the fluoridation process on Brazil. After 1990 only 41 cities implemented fluoridation on the water.
Page 11: How does one carefully perform a correlation? You’re discussion of the correlation to check the stability makes reference to the “growth in the HDI” comment in the results?

This question regarding the “growth of the HDI” can be solved analyzing the contextual effect of the HDI-M, where it becomes more plausible when it is stable for a certain time. Looking at the correlation between the available HDI-M for years 1991 and 2000, the high correlation found between the two years \( r = 0.8; p = 0.00 \) strengthens the hypothesis, since this index remains stable for the municipal districts, at least in the period of one decade considered above. However we chose for not insert this paragraph on the text, since the literature is well provided on this subject.

Page 11: Again, you make reference to the HDI without saying anything about it other than, cryptically, that it provides multidimensional characteristics of living conditions.

This was corrected with the insertion of a brief description of HDI in the introduction.

Page 12: What do market influences have to do with water fluoridation?

We believe that this is clear in follow paragraphs copied from the main text:

There are indications that the expansion of the fluoridation coverage among the population depends on federal government incentives and not on the privatization of the water and wastewater sector, as well as on a culture among
both the population and institutions that favours the implementation of this measure [39].

In a recent case study in the State of São Paulo, Brazil, focusing the costs of public water supply fluoridation between 1985 and 2003, the conclusion was reached that justifying the non-implementation of this measure due to the high cost is a fallacy. The cumulative cost in the period under study was R$ 1.44 (US$ 0.97) per capita. The estimated annual per capita cost for 2003 was R$ 0.084 (US$ 0.028). The findings make it clear that the amount is insignificant when compared to the benefits provided by fluoridation, in terms of the improvement in the population’s quality of life, and the reduction in demand for oral and dental treatment [40].

Page 12: “consonant” is a strange word to use, you’d be better with “consistent” or “concordant” or some such.

We appreciate the suggestion. It was corrected in the text.

Page 12: It is only when the HDI-M is taken in isolation does it have explanatory power.

We appreciate for highlighting this item. This can be understand in the context of the paragraph:

This may suggest that if the HDI-M is taken in isolation, it loses its explanatory power. That is to say, the context of the macro region and its structural level of development may result in municipalities with better HDIs, but located in
poorer regions, not having fluoridation, whilst municipalities with worse HDIs located in more prosperous regions may have implemented fluoridation.

Page 14: You should not confuse inequality with inequity and you might want to qualify and expand your rather glib mention of human rights if you want to retain it in the manuscript.

We appreciate the suggestion. However we used this term in all text and its meaning is clear for us. Regarding the “glib mention of human rights”, it was removed from the main text.

Page 15: Again, combine the paragraph with the one at the bottom of Page 14. I’m not sure why new studies need to confirm the findings from the manuscript. They are pretty straight-forward and the timing of water fluoridation and the values of HDI-M for the areas etc. I wouldn’t imagine would be open to interpretation.

We appreciated the suggestion. It was corrected on the text.