Reviewer's report

Title: Suicide rates and income in Sao Paulo and Brazil: a temporal and spatial epidemiologic analysis from 1996 to 2008.

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Reviewer: Chi-kin Law

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General Comments

Obviously, the revised draft has been greatly improved. The authors have compiled a comprehensive literature review on the existing theories of suicide in bringing out their study objectives.

However, as an ecological study on suicide epidemiology, they failed to justify why it is necessary to investigate the issue in 3 different levels: national, state and city. As the largest country in Latin America, factors associating with suicidal behavior may vary considerately (even income is a common factor) across states. Is it appropriate to put them all together for analysis? Are there any linkages among these 3 levels can be found through this study? I am afraid there won’t be any, as the findings highlighted income was directly associated with suicide at the national and city level, while an inverse association was found at the state level.

Also, the authors did not explain why they chose the state of Sao Paulo among the 27 States in Brazil for the analysis at the state level. Would it be better to use the data of Distrito Federal (as the capital city) or Rio de Janeiro (as the former capital city) in representing the whole country? Similar query applies to the city of Sao Paulo (out of 645 municipalities within the state)?

In addition to analyzing the spatial pattern of suicide, the draft also investigated the temporal transition of suicide across the 3 levels over the 12-year period of study. However, not much attention was given in this aspect in the background section of study. The authors should provide a few line in justifying why it is necessary to put the time variable into the study. I understand the draft is already lengthy in justifying the significance of conducting an ecological study. So, they need to think whether it is worth to put messages here, if something is less important than others.

Major compulsory revision

1. In page 3, 2nd paragraph, line 1: The highest suicide rate in Eastern Europe (former USSR countries): Please bear in mind not every country in Eastern Europe was formerly USSR states (like Poland, Hungary, Czech Republic and so on). These countries were independent states before 1989. So, it is better to use “Former socialist economies “ rather than “former USSR” to describe these
states.

2. In page 4, 2nd paragraph, line 2: “For instance, different study designs have been used to evaluate…” Please provide some examples of study designs following the sentence.

3. In page 5, 1st paragraph: review of literature shows income was associated with male suicide from other countries’ experience. As referred to Table 3, statistical tests show the association of female suicide and income was not significant at the state level. Would it be better to trim down the scope of study and just focused on male suicide?

4. In page 5, 2nd paragraph line 3: Should be GDP per capita, not GPD

5. What do you think by Income in the study? Does it refer to GDP per capita? Average household income? Average household income per capita? Or Average employment earnings?

6. In defining the 3 income tertiles, which indicator (as appeared in point 5) was used?

7. In page 5, 3rd paragraph line 3: Brazil covers a wide area with almost “200 million” inhabitants… But when refer to Table 1, the country only had “170 million” persons. Please clarify which one is correct.

8. In page 8, it noted that average income was highly correlated with HDI, Gini Index and education with a Pearson correlation at 0.95, -0.66 & 0.87. Obviously, I like to know how the authors estimated the Pearson correlation of average income and education when they presented the statement. As what I know, Pearson correlation can only be calculated between 2 numerical variables. Yet, education itself is an ordinal variable (from no schooling to doctoral degree), which cannot be used to fit a Pearson correlation with other variables.

9. In page 9, paragraph on spatial analysis, line 7, the authors should define what is RR (despite it should be represented as “relative risk”)

10. In page 9, paragraph on spatial analysis, line 10, it would be better to rephrase the sentence from “annual average mortality” to “average annual mortality”

11. In page 9, 2nd paragraph on descriptive analysis: It is confusing. I guess the author would like to claim the sex ratio among the national level, state of Sao Paulo and Sao Paulo city. But it looks like the State of SP had the highest ratio when compared with the 27 States and Sao Paulo city had the lowest ratio among the 645 municipalities. The authors should rephrase the sentence to avoid unnecessary misinterpretation.

12. In page 10, 2nd paragraph on spatial analysis: Is it possible to report the suicide rate for those states (e.g. Rio de Janeiro, Espirito Santo, Minas Gerais and Bahia States) mentioned in the paragraph?
13. In page 11, 1st paragraph: Similarly, is it possible to report the suicide rate for Campinas and north of SP in showing their lower-risk cluster?

14. In Page 14, 3rd paragraph: It is mentioned that the reduction in suicide rate was mainly contributed by the improvement of health care in the last decade. Yet, as illustrated in figure 2A to 2C, the reduction was mainly contributed by the more wealthy area, which is supposed to be less influenced by the improvement in public health care service over the period. So, I think it is not justifiable to explain for the rate change over the period.

15. In Page 14, 3rd paragraph line 4: The authors claim there is no convergence in the city of SP. Yet, as illustrated in Figure 2C, it shows the rate in Area 1 and Area 3 was converging while the rate has reverted upward since 2003. So, it suggests income becomes a less prominent factor in the city of SP (esp. area 2 became the highest risk area in 2008). The authors should be notified the change, rather arguing income is the sole factor of suicide in the city level.

16. So, despite income remains a prominent associated factor of suicide in Brazil, its impact on suicide rate (whether it would heighten or lower the risk) remains unclear at different levels.

17. In page 16, 1st paragraph, line 2: Please unify the use of word “Becoming” and “Being” in the text.

18. In page 16, 2nd paragraph: As the authors highlighted the undetermined cause of death may impose an artifact on the analysis, would they think it would be more appropriate to include all deaths by “R99” into the analysis, which can improve the coverage of the study. Actually, this is not new, as some prior studies in UK (shown below) also included undetermined causes.


Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests:

I declare that I have no competing interests