Author’s response to reviews

Title: Socioeconomic inequalities in suicide mortality before and after the economic recession in Spain

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Author’s response to reviews:

WE ENCLOSE HERE OUR ANSWERS, BUT AS THERE IS A TABLE INCLUDED, WE HAVE UPLOADED THESE ANSWERS AS A FILE (AFTER THE TABLES OF THE MANUSCRIPT)

ANSWER TO THE REVIEWERS COMMENTS

We would like to thank the comments of both reviewers because they have been useful to improve the paper. All changes done are shown in yellow colour in the paper.

Answers to the comments of Reviewer 1

1. The title could be more informative. Since educational level is the exposure in focus for this paper, the authors could consider using that specific term in the title. The term "socioeconomic inequalities" gives the reader the impression that multiple inequalities are being assessed. Also, the current wording gives the impression that study involves only the period "during the recession", but the data cover 3 periods, two of which are prior to the recession.
ANSWER: We have changed the title by “Socioeconomic inequalities in suicide mortality before and after the economic recession in Spain”. From our point of view it is better to include “socioeconomic” taking into account that educational level is an indicator of socioeconomic position.

2. Abstract: Also here it could be clarified in both the aim and the conclusion that educational level was the exposure of interest.

ANSWER: “Educational level” has been included in Methods and Conclusion. As said above, we think it is better not to change the objective taking into account that educational level is an indicator of socioeconomic position.

3. The introduction section could be more informative. Just as an example, the statement that "Nearly all European countries have experienced a marked increase in suicide mortality rates during the current economic recession" could be tempered as the two cited references demonstrate increased rates in men only. Overall, it was a bit difficult to get a grasp on this section. What is actually already known, and how the current study could be expected to add to the literature? What did the authors hypothesize/anticipate that they might find?

ANSWER: We have added some text, a new bibliographic reference and also the hypothesis we had.

4. Study design and population: What was the rational for the age cut-off at 25? Since the highest education level was defined as 15 years or more, persons in their early 20's might have been included, which would increase the number of cases. I'm not necessarily saying they should have been, I'm simply asking about the rational for the cut-off.

ANSWER: We have included people of 25 years and more because we assume that at this age the university has finished (for those who have high level of education). We have added a sentence explaining it.

5. In many suicide studies also uncertain suicides are included. The choice to include only deaths in the "X" series and not "Y" series could be discussed, as rates of uncertain suicides (Y series) vary from country to country for example due to administrative differences in forensic categorization.
ANSWER: The code of the causes of death is filled using the forensic information. For this reason the Y codes are not used in these settings.

6. The section describing the different procedures employed for Barcelona and the Basque Country data could be better clarified. For the Basque data, (but not for Barcelona?) "deaths were weighted by the inverse of the proportion of cases". Please clarify.

ANSWER: This study is based in 2 settings in order to find the consistency of the results. But, as it is explained in the article, the methodology followed for each setting is not the same. For the Basque country we follow cohorts, the deaths are weighted for the inverse of the proportion of the linked deaths. Barcelona is based on a cross-sectional design using census data and the register of mortality linked to the census. We have used similar methodologies in other articles of some European projects (see for example: Mackenbach JP et al., Trends in inequalities in premature mortality: a study of 3.2 million deaths in 13 European countries. J Epidemiol Community Health. 2015;69(3):207-17.

7. It is stated that "The use of the RII can be interpreted was the ratio of mortality rates between the two extremes of the educational spectrum." It would also be interesting to get an estimate on how much suicide risk was reduced for each additional level of education in men.

ANSWER: The RII takes into account the 5 levels of educational level; it is a quantitative variable (with five values between 0 and 1, based on the midpoint of the educational level group’s position in the cumulative educational level distribution of the population). It is interpreted as the ratio of mortality rates between the two extremes of the educational spectrum (taking into account all educational level groups). Due to the different periods and the 2 settings, to include educational level as 5 categories would be difficult because there would be not enough number of cases in each category. Moreover, the presentation of results would be much more complicated.

8. Table 1 would be a bit easier to interpret if it were to employ a layout more similar to that in Table 2, that is with columns showing data for the two periods before and the one period during the recession. Also, there is a massive amount of text within the Table 2 due to the extensive labels in the education level column. These labels could be shortened (No education, Primary education, Lower secondary, Upper secondary, University) as full descriptions of the different levels are shown in the methods text.

ANSWER: We have changed the table as suggested.
9. Figure 1: Heading should read "Suicide mortality rates" rather than "mortality rates".

ANSWER: We have changed it.

10. Table 2: The heading does not seem to make sense. If I have understood correctly, both RII and SII are calculated to demonstrate differences in mortality between groups attaining lowest vs highest educational level, which means these results cannot be shown by educational level.

ANSWER: We have modified the title and added an explanation as a footnote.

11. Table 2: "Pais Vasco" should be translated to English. Also, there seems to be a typo for the group of women over 65 (second to the last row in the table).

ANSWER: We have modified the text.

12. Last sentence in Results section (It is worth mentioning…): It would be helpful if results of statistical testing were shown- perhaps in a supplementary file?

ANSWER: We present the results on this table. The reviewer can see that they are not statistically significant. We think that it is not necessary to include these results, but if the editor considers that they are necessary, they can be added.

Table: Interaction between RII and period p-values by educational level, age group and sex. Barcelona and the Basque Country, 2001-2012.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Barcelona</td>
<td>Men</td>
<td>25-44</td>
<td>0.462</td>
<td>0.159</td>
<td>0.494</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45-64</td>
<td>0.781</td>
<td>0.267</td>
<td>0.376</td>
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<tr>
<td></td>
<td></td>
<td>&gt;=65</td>
<td>0.473</td>
<td>0.993</td>
<td>0.493</td>
</tr>
<tr>
<td>País Vasco</td>
<td>Men</td>
<td>25-44</td>
<td>0.189</td>
<td>0.961</td>
<td>0.223</td>
</tr>
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<tr>
<td></td>
<td>45-64</td>
<td>0.435</td>
<td>0.955</td>
<td>0.422</td>
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</tr>
<tr>
<td></td>
<td>&gt;=65</td>
<td>0.706</td>
<td>0.593</td>
<td>0.860</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.145</td>
<td>0.808</td>
<td>0.201</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>25-44</td>
<td>0.771</td>
<td>0.626</td>
<td>0.817</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>0.879</td>
<td>0.985</td>
<td>0.880</td>
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<tr>
<td></td>
<td>65 ó +</td>
<td>0.523</td>
<td>0.644</td>
<td>0.263</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.994</td>
<td>0.317</td>
<td>0.283</td>
<td></td>
</tr>
</tbody>
</table>

95% CI: 95% Confidence Intervals

13. The first paragraph of the discussion section could be restated to better clarify the key findings. It is stated in the second sentence of this paragraph that inequalities among men under 65 in the Basque Country showed a non-significant increase during the recession period with respect to the previous period. As there is quite a bit of overlap in the CIs of the RII values for these two periods, this non-significant finding might be toned down to allow for more focus on the key findings.

ANSWER: This sentence has been deleted.

14. Discussion, paragraph 3 lines 2-4: It is stated that "Relative educational level inequalities in suicide mortality increased in the recession period only among men younger than 65 years of
age in the Basque Country." Please show data supporting this statement in the Results section.

ANSWER: The data is already included: “Among men younger than 65 years of age in the Basque Country, RII scores diminished during the second time period, but increased again in the third. For example, the RII score of the 25–44 years age group was 4.04 in 2001-2004, 2.36 in 2004-2008, and 3.96 in 2009-2012; we observed a similar pattern in the 45-64 age group.

15. The discussion section as a whole could be deepened. Some examples: findings regarding RII and SII scores are scantily discussed, and a discussion of gender differences would be an interesting addition. There is some previous literature suggesting that suicide rates are more prone to "respond" to socioeconomic change in men than in women. In light of that, how do the authors interpret their own findings? Also, why do they think that the decline in mental health in less privileged groups observed by other authors is not reflected in suicidal mortality?

ANSWER: Some parts of the discussion have been rewritten (see page 9).

16. Limitations could be discussed. A major limitation is that information was lacking for employment, occupation, income, social class etc. The pros and cons of using of educational level as an indicator of socioeconomic inequality could be discussed. Also, the fact that a one tenth of the suicides could not be included due to missing info on education level should be listed as a limitation. Might it be possible that this could have introduced bias (ie persons with higher education more likely to be recorded in the education data base and thus more likely to be included in the study?)

ANSWER: These limitations are now included in the discussion section.

17. Second to the last paragraph in the Discussion: Not sure I understood the statement that using RII and SII scores "allowed study of all educational levels simultaneously". In the methods section it is stated that these scores compare lowest and highest.

ANSWER: As it has been explained above, the RII takes into account the 5 levels of educational level; it is a quantitative variable (with five values between 0 and 1, based on the midpoint of the educational level group’s position in the cumulative educational level distribution of the population). It is interpreted as the ratio of mortality rates between the two extremes of the educational spectrum (taking into account all educational level groups). We have added some text in the Methods section.
18. References seem appropriate and up to date. The title of reference 21 (in Spanish) could be shown in English in brackets, if this corresponds to journal style.

ANSWER: The references have been revised.

19. Minor comment: Redundant (identical) text is shown both under the heading Funding and under the heading Acknowledgements.

ANSWER: We have deleted the Acknowledgements section.

Answers to the comments of Reviewer 2

On Page 2, in your abstract, you wrote "the economic recession within two Spanish settings." I would recommend changing this to "the economic recession within two geographical settings in Spain."

ANSWER: Change done.

On page 3, in your introduction, you wrote, "Suicide is one of the most important causes of premature mortality, as it mainly affects the young population." - this is not an accurate statement, as suicide is not an important cause,- it is rather a large and recurring cause. I would change this to "Suicide is a recurring cause of premature mortality, particularly among young individuals in the population."

ANSWER: In Barcelona and Basque country suicide mortality is one of the first causes of death in the young population, we have changed the sentence to explain it.

In the next paragraph, you start the sentence with "evidence shows." Unless you are going to refer to the evidence more in detail, I would refrain from writing that. Instead, you might want to say, "It has been well established through previous studies…"

ANSWER: Change done.

In the last paragraph on page 3, you wrote, "there is still an insufficient number of studies looking at the link…" This is not a good phrasing, as "insufficient" is not the right wording to
use in the context when trying to say that there are few studies on the topic. I would change this to "there is insufficient information regarding the link..."

ANSWER: Change done.

On page 4, in the methods section, you write that the Basque country is an autonomous community. What do you mean by this? I would expand a bit.

ANSWER: We have explained it.

In the next paragraph, when you refer to the ICD-10 codes, I would write out what they stand for.

ANSWER: We have included that they are codes of “intentional self-harm”.

On page 5, I would change the dates of the start and ending of your research, it is enough to refer to the month.

ANSWER: Changed done.

In the last paragraph on page 5, you wrote "unemployment levels did not start to rise markedly until 2009." I would change markedly to noticeably.

ANSWER: Change done.

On page 8, you start a sentence by saying that it is "worth mentioning." I would delete that comment, and start with "Models that included."

ANSWER: Change done.

On page 8, you also wrote "RII were not different over time". I would change that to "RII did not change over time."

ANSWER: Change done.
On page 8, in your discussion section, there are a few changes that I would like to recommend:
You wrote, "...but with educational level inequalities appearing mainly in men."
I would change this to "...but with educational level inequalities mainly affecting men."
ANSWER: Change done.

In the next paragraph, you wrote, "This study does not show an increase...."
I would change that sentence to "This study did not find..."
ANSWER: Change done.

On page 10, you wrote, "However, it is necessary to further monitor this mortality in the future because the economic recession could have more far-reaching longer-term effects." I would recommend changing the end of that sentence to "...could have greater long-term effects."
ANSWER: Change done.