Author’s response to reviews

Title: Cardiovascular mortality and risk behaviours by degree of urbanization before, during and after the economic crisis in Spain

Authors:

Almudena Moreno-Lostao (amorenolostao@hotmail.com)
Juan M Guerras (jguerras@isciii.es)
Lourdes Lostao (llostao@unavarra.es)
Luis De la Fuente (lfuente@isciii.es)
David Martínez (davidmartinez.ucm@gmail.com)
Fernando Rodríguez-Artalejo (fernando.artalejo@uam.es)
Enrique Regidor (enriqueregidor@hotmail.com)

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Author’s response to reviews:

REPLIES TO EDITOR

1. Expand your rationale behind why the association between the recession and mortality may vary by the degree of urbanisation;

AUTHORS:

Following the recommendations of the editor, in the new version we have included a paragraph in the introduction where we indicate the rationale for why the trend in cardiovascular mortality could be different depending on the degree of urbanization. That paragraph is the following:

“…In the European Union, the percentage of people at risk of poverty is higher in rural areas than in urban areas. After the appearance of the economic crisis of 2008, this percentage decreased in rural areas and increased in urban areas, or, as in the case of Spain, this percentage increased less in rural areas than in urban areas [23]. The lower employment rate in rural areas and, therefore, the lower economic activity in rural areas, explains this different impact of the economic crisis according to the degree of urbanization. This fact could have had its correlate in a lower decrease in the prevalence of health risk behaviours in rural areas than in urban areas and, consequently, in a lower decrease in cardiovascular mortality in the former than in the latter…”
Good questions! There is no unanimity about the concept of rural among researchers or even among planners and decision-makers. From the theoretical point of view, different criteria are discussed - geographic considerations, or to social, cultural, or even economic ones-. However, the difficulty of obtaining routine information of these characteristics in most of the countries, together with the ambiguity of some of the criteria, means that researchers use a pragmatic criterion: population size. In addition, this criterion allows the comparison of results between different investigations, regardless of the place of origin of these investigations. So, Following the suggestion of the editor, in the new version we have included in the next paragraph in the methods section:

“The concept of rurality varies between researchers or even among planners and decision-makers. Several criteria have been proposed: population size, population density, distance from an urban centre, spatial contiguity, economic activity, proportion of residents commuting to work in an urban centre. Some authors argue that the concept of rural also refers to social and cultural attributes. However, the availability of routine information of these characteristics is rare, apart from the conceptual ambiguity of some criteria and the different meaning of others from one country to another. Therefore, most authors use the criteria we have used in our research: population size. It is a definition that can be easily operationalized and, in addition, allows the comparison of research results made in different countries.”

3. Provide more detail on how rate ratios were calculated in the methods section;

AUTHORS

We agree with the reviewer. In our first version we did not include enough detail. In the new version we have been more exhaustive. Specifically, in a new version we have included the following in methods section:

“The relationship between the area of residence and the rate of premature mortality in each 3-year period was summarized with the age-standardized mortality rate ratio calculated by stratified analysis. The confidence intervals of the mortality rate ratio in small urban area and rural areas were calculated using the variance estimated by the Mantel-Haenszel method...”

4. add 95%CIs to the mean percentage changes in Table 2;
AUTHORS

In the first version we performed a simple analysis that did not allow to obtain confidence intervals. Following the advice of the reviewer, in the new version we have obtained the confidence intervals of the percentage of annual change, by means of a segmented linear regression analysis. In the new version we have included the following in methods section:

…We then calculated the mean annual percentage change (mAPC) in the mortality rate in each of the 3-year periods, by segmented linear regression taking as a dependent variable the logarithm of the annual age-standardized mortality rate.

5. Table 2 - change Spanish to English text;

AUTHORS

Thank you. Done!

6. Are you able to adjust estimates for the association between urbanisation and mortality for the lifestyle variables (ie obesity, smoking etc)?

AUTHORS

Unfortunately we could not do what the editor suggests as it is two different sources of information. On the one hand, we have used mortality registry data and, on the other hand, we have used data from national health surveys for estimates of lifestyle variables. It is not possible in Spain to link information from health surveys with mortality registration information.

7. page 9 line 34 - reference statement on UK.

AUTHORS

Thank you. Done!

REPLIES TO REVIEWER 1 (Eurice Lobo)

Eurice Lobo, MSc, CPH (Reviewer 1): The paper draws attention to a largely neglected or untapped area of comparison. Disparities between geographic locations, especially urban-rural need more attention and focus. The authors have done a great job in defining the differences, and further explaining the same among men and women. Smoking, obesity, and physical inactivity are usually perceived as issues plaguing the urban populace, but the authors have helped reduce the blur.
AUTHORS:

We appreciate the reviewer's comment. It is a matter scarcely studied in scientific practice and with surprising findings. We believe that this line of research will be important in the near future.

*Definition of premature death - have the authors considered the average life expectancy of the Spanish population, and defined premature death?

AUTHORS:

The reviewer raises a very interesting issue: the criterion of premature mortality. There is no unanimous criterion, although the most used is the one that we have selected. We believe that this criterion is the most appropriate since it is what allows comparison over time and between populations. The choice of life expectancy entails an age limit every year, so that comparing results from one year to the next is not possible. In the new version we have introduced the following comment in the methodology section:

“There is no unanimous criterion in the scientific community regarding the age limit for the calculation of premature mortality. Sometimes other upper limits are used, such as the average age of death or life expectancy. The problem with these last criteria is that the limit varies from one year to another and varies among population groups, for example between men and women. We have chosen the majority criterion (deaths in persons less than 75 years), since the choice of a fixed age allows the comparison of the premature mortality rate over time and between different population groups and countries”

*Obesity definition: Reason for ≥30 kg/m² as cut-off - has any standard reference e.g. WHO standards been used? Please explain and provide reference for the same

AUTHORS:

As the reviewer points out, we have used the criteria of the World Health Organization. In the new version, we include this reference. Likewise, in the new version we pointed out that smoking, physical inactivity and obesity are associated with an increase in cardiovascular mortality and we accompany that affirmation of several references. Specifically in the new version can read the following:

Obesity was defined as BMI ≥ 30 kg/m², according the World Health Organization. It is known that smoking, physical inactivity and obesity are associated with an increase in cardiovascular mortality.


*Page 6 - results: % values should be added especially in statements with comparisons.

AUTHORS

We appreciate the reviewer's suggestion. In our first version we had given no numbers in the second paragraph on page 6. In the new version we have included different figures that allow comparison. Specifically, that section in the new version is written as follows:

“In men, those in small urban areas had the highest mortality, and those in rural areas had the lowest (Figure 1). The mortality rate per 100,000 population in small urban areas and rural areas was 129.0 and 115.6 in 2005, and 81.2 and 82.0 in 2016, respectively. In women, those in small urban areas also had the highest mortality, while those in large urban areas had the lowest. However, beginning in 2012, the mortality rate in residents of large urban areas was similar to that observed for residents in rural areas (Figure 1). In 2016, the mortality rate per 100,000 population in large urban areas and rural areas was 30.9 and 30.7, respectively”

REPLIES TO REVIEWER 2 (Nisha Naicker)

National Mortality Data is a valuable source of information for surveillance, assessing trends and for planning relevant public health interventions. Thus this paper highlights the use of this type of data.

1. introduction-

*few references missing for the text- para 2, line 34-44, para 3 line 52-54.

AUTHORS
We appreciate the reviewer's suggestion. In the first version we assumed that the reader could know what we pointed out in lines 34-44 and it does not have to be that way. In the new version we have included several references that support our affirmations. Likewise, we have included the references in lines 52-54. In this case, basically the references that appear later in more detail in the paragraph. The references added are the following:


*In the intro - there should be information on the risk behaviours that was included in the analyses.

AUTHORS

Following the suggestions of the reviewer, in the new version we made explicit reference to the three risk behaviours of cardiovascular diseases that we have analyzed in our study. Specifically, the following can be read in the new version:

“…which was attributed to a greater reduction in risk behaviours due to the decline in personal income, as smoking, obesity or physical inactivity”

*A definition of what is meant by an economic crisis is necessary.

AUTHORS

We appreciate the suggestion of the reviewer since it is a concept more used in the field of economics than in the field of public health. Following the advice of the reviewer in the new version we have included the following comment about the definition of economic crisis:
“…An economic crisis is a business cycle contraction when there is a general decline in economic activity, lasting more than a few months, normally visible in real gross domestic product (GDP). The GDP registered a continued decrease during the last semester of 2008 that caused Spain, for the first time in fifteen years, to enter a recession…”

2. Methodology-

*the ICD 10 codes used for cardiovascular diseases (100-199) included cerebrovascular diseases (160-169) which could be linked to the risk factors) and valvular diseases (134-137). Not all the diseases involving the valves are linked to the risk factors- a note must be made as to why all related CVS diseases were included.

AUTHORS

We agree with the reviewer. There are cardiovascular diseases not directly related to the risk behaviors analyzed. However, the majority of deaths due to cardiovascular diseases are related to the risk behaviors that we have analyzed. In the new version we have included the following comment in the limitations section of the discussion:

“…Some cardiovascular deaths are not related to the risk factors analyzed, such as valvular diseases. However, premature deaths from valvular diseases represent only 1% in men and 3% in women of all premature cardiovascular diseases. On the other hand, premature deaths from heart disease, cerebrovascular diseases and hypertension, related to the risk factors studied, represent 93% in men and 95% in women of all premature cardiovascular deaths…”

*In the National surveys- where there any other risk factors that were included- family history, actual socio-economic data etc. Need to clarify why only these three factors (obesity, smoking and exercise) were considered.

AUTHORS

We appreciate this reviewer's suggestion. In our first version we did not give a reason why we chose those risk behaviors. In the new version, we have included the reason why we chose these three risk factors, despite the fact that health surveys collect a wide variety of factors related to mortality from cardiovascular diseases. Specifically, in the methods section of the new version, the following can be read:

“National health surveys collected several factors that show association with mortality from cardiovascular diseases, such as risk behaviors, socioeconomic status or social support. However, we selected those factors that in previous studies have shown the variation in prevalence during macroeconomic fluctuations [15,17, 37-38].”

17 Gerdtham U, Ruhm C J. Deaths rise in good economic times: evidence from the OECD. Econ Hum Biol 2006; 4: 298-316.


*Also what is the quality of the National Mortality data- please describe briefly. Will there be any limitations using this data.

AUTHORS

Following the suggestion of the reviewer, in the new version we have included in the limitations section an indicator of the quality of statistics on cause of death in Spain:

“Mortality data are a source of information of great value, since they collect a phenomenon - death- exhaustively and, in addition, it is a routine source which allows the comparison of the mortality rate over time. However, the analysis by cause of death may be biased if a large percentage of deaths are coded as poorly defined cause of death (codes R00-R99 of the ICD-10). Such a bias does not occur in the mortality data in Spain because only 2% of premature deaths are assigned to those codes.”

* The age cut off of 75 years is quite high for premature death- what is this based on. What is the average life span of men and women in Spain.

AUTHORS

As have mentioned previously regarding the same question by reviewer a, this is very interesting issue. The choice of life expectancy entails an age limit every year, so that comparing results from one year to the next is not possible. In the new version we have introduced the following comment in the methodology section:

“There is no unanimous criterion in the scientific community regarding the age limit for the calculation of premature mortality. Sometimes other upper limits are used, such as the average age of death or life expectancy. The problem with these last criteria is that the limit varies from one year to another and varies among population groups, for example between men and women. We have chosen the majority criterion (deaths in persons less than 75 years), since the choice of a fixed age allows the comparison of the premature mortality rate over time and between different population groups and countries”

* Reference the BMI of >30 == obesity.
In the next version we have included the next reference:


3 Results:

*the Figure 1 is not very clear - needs a higher resolution.

AUTHORS

We agree with reviewer. Neither do we see well the figure in the pdf that created the online editorial system. But in our experience this is very common. On the other hand, when the articles appear published, the figures that were unclear in the online system appear very clear once the article is perfectly formatted by the journals.

*In table 1 for men in large urban areas and in rural areas for 2005 the number of deaths is greater than the total population in these areas. is this correct- if yes please explain?

AUTHORS

The reviewer has been confused when looking at table 1. The population data appear in thousands.

*For the percentage ratio- state that the reference (denominator) was the large urban areas- didn't see this in the methods.

AUTHORS

That comment appears at the end of methods, together before results.

4. Discussion:

*what were the reasons for differences between men and women in terms of risk factors and mortality. The discussion needs to be improved. Its very superficial currently.

AUTHORS:

This is the first study conducted in Spain that shows the pattern of mortality from cardiovascular diseases and the pattern of risk behaviors according to the rural-urban environment of residents.
So, there is not enough empirical from other studies to support reasonably valid conclusions. Therefore, we believe that we have to be honest and point out the impossibility of finding a plausible explanation for these findings. In any case, in the new version we have included the following comment:

“This is the first study that shows the pattern of mortality from cardiovascular diseases and the pattern of risk behaviors in urban and rural areas in Spain. We do not know the reasons for this different pattern in men and women. A possible explanation could be that the socioeconomic profile according to the area of residence was different in women and men. It is known that risk behaviors for health are related to the educational level. However, the educational level in men and women does not show a different distribution depending on the area of residence. Therefore, all we can say is that for unknown reasons, men in rural areas tend to adopt health risk behaviors in a lesser proportion than men living in urban areas, but this does not happen in women”

*What is the public health impact of these findings? How will this information be used to improve the health of the population?

AUTHORS:

Although we can not offer explanations of the reasons for the findings found in men and women, such findings are of great importance for interventions in the population. Therefore, following the suggestions of the reviewer, in the new version we have added the following comment to the conclusions section

“…This different pattern suggests that public health interventions to reduce the burden of cardiovascular disease in the population should establish different priorities for men and women, depending on the rural or urban setting where such interventions are implemented….”

5 References-

*reference 16 is missing.

AUTHORS

Thank you! In the new version we have included that reference.