Author’s response to reviews

Title: USE OF ORAL HEALTH CARE SERVICES IN PERU: TRENDS OF SOCIO-ECONOMIC INEQUALITIES BEFORE AND AFTER THE IMPLEMENTATION OF UNIVERSAL HEALTH ASSURANCE

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Author’s response to reviews:

Reviewer 1

We thank reviewer 1 for the commentaries and suggestions to our manuscript. Below, there is a list of the corrections included in the document.

1. Title: In the title, authors used a word "de". I think they meant to write "the".

The title was corrected. Now, the title is “USE OF ORAL HEALTH CARE SERVICES IN PERU: TRENDS OF SOCIO-ECONOMIC INEQUALITIES BEFORE AND AFTER THE IMPLEMENTATION OF UNIVERSAL HEALTH ASSURANCE”. This change figures in the front page and in line 2 of the manuscript’ body.

2. Abstract: Authors have used "disparities" and "inequalities". I suggest using one word "inequality" for uniformity.

Corrected in all the extension of the manuscript (See track changes in Word document).

3. Abstract - Results sub-section: I suggest authors start the sentence like this "Study participants included were …"

We agree with the suggestion. Now figures in the “Results” subsection of the abstract: “Study participants included were 85 436 (2004), 88 673 (2008), 87 074 (2010) and 124 142 (2017)”. We also added this information in the first paragraph of the “Results” section.
4. Background: Page 4 line 3: Add a reference to this sentence "Oral Health is a cornerstone for good health and optimal quality of life".

We just updated this sentence. Now it figures:” Oral Health is a determinant factor for good health and optimal quality of life, based on the health burden that it represents and its relationship with the presence of different chronic conditions”. Also, we added the reference for this statement.


5. Background: Page 4 line 9: Authors wrote “…being Asia and Latin America the countries with the higher burden”. Asia and Latin America are continents and not countries. How about Africa, is the burden low in Africa? I suggest a sentence like this "with higher burden in low and middle income countries (LMICs) such as those from Asia, Africa, and Latin America continents"

Suggestion accepted. Now it figures: “The oral health burden of disease is presented heterogeneously around the world, with high burden in countries in low and middle-income countries due to inadequate fluoride-based interventions and low access to primary oral health care services”. Also, the web link to the references was updated.


6. Background: Page 4 line 49: Authors wrote: "show a reduction in the inequity in oral health services utilization" I have a comment about using the word "inequity". I suggest using "inequality" for uniformity.

Corrected in all the extension of the manuscript (See track changes in the Word document).

7. Page 5 line 28: The dependent variable has a time frame of 3 months. In other literature, a time frame of 12 months or 6 months have been used. I would be nice to provide a reference for the 3 months’ time frame. Because I believe if this paper used a 12 months' period, perhaps the proportion of the dependent variable will be higher.

Indeed, the dependent variable was measured in the last three months. The inclusion of this period is due to the fact that the ENAHO survey takes this period to collect information on dental care. In this regard, other surveys in the region also include a period of three months to evaluate access to dental health services. An example of the above is the case of Chile in the following studies:


Although it would be interesting to evaluate access within six or twelve months, the study's data source only allows the assessment in the mentioned three months period. Thus, we consider including this observation as a limitation of the study that restricts its comparability with other studies, but that provides important information for the study of inequalities in Peru.

8. Page 4 line 30: Please indicate how many quintile groups are categorized and indicate which is quintile is poorest and which quintile is richest. Also include this information in Table 2.

We added the following information about quintiles categorization in the Methods section: “... 3) Quintile: included five per capita expenditure quintiles (each quintile contains 20% of the total population: quintile 1 are poorest, and quintile 5 are richest)...”. Also, we specified this information within table 2.

9. Page 6 line 34: I suggest adding a sentence or two about multiple comparison approaches. I feel this will improve the paper.

We added the sentence in the second paragraph of the subsection “Data analysis” of the Methods section: “MCA is a decision rule in which only a significant difference is required to establish dominance between multiple quantile comparison points”. The following sentences include the reference which can be used for the reader interested in methodology concerns.


10. Page 6 line 44: Authors wrote "Processing and statistical analysis". I suggest writing "Data management and analysis"

Suggestion accepted. Now it figures in the last sentence of the “DATA ANALYSIS” subsection: “Data management and analysis were performed using the software Stata® (Stata Corporation, College Station, Texas, USA)".
11. Page 6 line 50: The "Ethical Considerations" section can be improved. This study used secondary data but I feel it is worth describing briefly how the ethical approval was obtained by primary investigators.

We added the following information in the last sentence of the “Ethical considerations” subsection: “ENAHO is a national survey conducted by the INEI. Because this survey is conducted by a governmental institution to generate indicators of interest to measure country’s development, it is not required a previous approval of the participants to consent their participation”.

12. Page 11 line 7: I suggest authors add more information about the reason why older adults showed increased inequality, including a reference.

For a better understanding, we paraphrase the information of the third sentence of the paragraph as follows: “In that sense, there are only a few oral health rehabilitation programs for elderly people, such as the national plan "Smile Again" (“Vuelve a sonreír”), but this initiative is focused on poor and extremely poor populations and it worked until 2016(33). The period of non-functioning of the program in 2017 may be affecting the increment of the inequality gap.”

We conducted a specific search in PubMed with the following search strategy: "oral health" AND "Peru". As results, there were no publications that could support our findings, this is aligned with the few publications about oral health in Peru. Also, official documents about the topic were searched, without success. Hence, there is a gap in knowledge.

13. Page 20 table 4: Please check language. There is a mix of languages used.

The latest version of the manuscript passed through the review of an English native speaker.

Reviewer 2

1. The paper needs to be revised with an English language editor (for example, the title says de implementation, which means "of" in Spanish, but means to undo in English!)

The latest version of the manuscript passed through the review of an English native speaker.

2. could use a bit more information in introduction on the universal access program - what led to this implementation, and how is the benefit structured? what is the co-pay or out of pocket costs? that would explain some of the wealthier access points.

We complement the fourth paragraph in the “Introduction” section. Now it figures: Until 2008, 40% of the Peruvian population was not affiliated with a health service.(10) In view of this, in
2009, the government of Peru promulgated the Universal Health Insurance (AUS) law. Within the framework of this law, the State included a package of preventive and essential health recovery services, including dental health, that is provided to the entire population, with an emphasis on vulnerable groups (11-13). The operation of this law eliminates or minimizes out-of-pocket expenses or co-payments. (14)


3. Under study design, you need to cite ENAHO

We added a citation for the ENAHO survey in the mentioned subsection.


4. I realize with a secondary data source you are stuck with the existing variable. but the 3 months window for services is low. can you extrapolate and help the reader understand what this means in annual terms, in comparison to the previously published data you put in the introduction?

As the reviewer mentioned, the dependent variable was measured in the last three months. The inclusion of this period is due to the fact that the ENAHO survey takes this period to collect information on dental care. In this regard, other surveys in the region also include a period of three months to evaluate access to dental health services. An example of the above is the case of Chile in the following studies:


Although it would be interesting to evaluate access within six or twelve months, the study's data source only allows the assessment in the mentioned three months period. Thus, we consider including this observation as a limitation of the study that restricts its comparability with other studies, but that provides important information for the study of inequalities in Peru.
5. can you expand on what specifically was specified in this sentences" "All estimations and respective expansion factors and sample design were specified"

We agree with the suggestion. Now figures: All analyses were estimated with sampling weights and the complex survey design of the ENAHO. This sentence is included in the “Data Analysis” subsection of the “Methods” section.

6. in results: you note "It's worth noting that up to 2017, the coastal population increased from 55.5% to 2.5% at the expense of Andean (31.7%) and jungle (12.8%) reduction." moving from 55.5 to 2.5 is not an increase, I had to look at table to understand, please revise. Also if you're going to say its worth noting, please explain why it is noteworthy.

Corrected. Now it figures: “In 2017, the coastal population represented 55.5% of the Peruvian population (increase in 2.5% from 2004) at the expense of Andean (31.7%) and jungle (12.8%) regions reduction.”

7. in your model, do you have any geographic dental care supply variables (# dentists per region) that might help explain variability?

The study carried out tries to evaluate inequalities in access to oral health services according to some characteristics available in ENAHO. Unfortunately, the survey does not include the variable mentioned by the reviewer.

8. Figure 1 is difficult to read, need higher resolution

The figures were sent in high resolution (using .TIFF files) individually; however, we believe that the low resolution would be due to the generation of PDF by the editorial management system of the magazine that would lower the quality of the figure. Also, based on observation 4 of Reviewer 3 we have considered improving the information presented in the figure by including one plot with all the 4 curves by each of the stratifying variable (please find attached the two new figures within the resubmitted documents).

Reviewer 3

We appreciate your revision for the manuscript. Please, find below the changes and corrections made for every point that you recommended to clarify.

1. In the analyses of trends over time in social inequalities based on consecutive cross-sectional surveys, one possible confounder is selection bias. The authors should report the participation rates of different ENAHO surveys, if available, and briefly comment on the potential bias introduced by any differential responding rate by social classes and years.
Participation rates were added for each year of the surveys (ENAHO 2004: 98.8%, ENAHO 2008: 98.9%, ENAHO 2010: 98.8% , ENAHO 2017: 99.4% ). We added this information into the first paragraph of the “Results” section. The low rate of no response obtained by the ENAHO does not affect the results and does not show differences between the study variables. In addition, the variation in the number of respondents and their causes are presented in the response to the following observation.

2. The 2017 survey has about 37000 more participants than the others. What is the reason? Is this due to different prevalence of missing data for some of the variables of interest? I think the authors should clarify this issue, as again it may cause some selection bias.

As the reviewer mentioned, the number of participants in the ENAHO has varied over the years. These differences do not obey missing data from ENAHO, as we mentioned in the previous answer. Among the reasons we have found and that has been reported by the institution that executed the survey (INEI) for the increase of the sample since 2012, we have the following:

Update of the sampling frame with the results of the 2007 census.

Since 2014, as in the previous year, ENAHO continued with the increment of the sample in the upper strata with the intention of oversampling the upper strata and improving the level of precision of the survey indicators. In addition, as of July 2015, the sample was increased in 249 conglomerates (1740 homes), which includes the recommendation of the Consultative Committee on Poverty.

Since 2016, the sample has increased in 411 conglomerates (2465 households), distributed in central urban coastal, south urban coastal and north urban Andes, with the objective of enhancing the representation of poor households in the General Household Register of Peru.

Therefore, it can be seen that for the year 2017 the housing sample of the ENAHO increased considerably, which implies an increase in the number of households included and consequently in the number of interviewees. We put the references where this information is available (information available only in Spanish from the primary source).

REF:

INEI. Perú - Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza 2017

https://webinei.inei.gob.pe/anda_inei/index.php/catalog/613#page=sampling&tab=related-materials

INEI. Perú - Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza 2012.
https://webinei.inei.gob.pe/anda_inei/index.php/catalog/367#page=overview&tab=related-materials
3. Although the ENAHO is a yearly survey (page 5 line 22), the authors have selected specific years (2004, 2008, 2010 and 2017). The authors should clarify why it was not possible to include all the available years in the analysis, and the criteria according to which the years were selected.

We added the following information: “For this study, we selected the years 2004 and 2008 surveys because they are the first and the last survey conducted before the AUS in Peru. It permits comparison in a frame period before the AUS program. In Peru, the AUS program was launched in 2009. For the period after AUS, we selected 2010 and 2017 (the first and the last available ENAHO survey data for this period).”

4. Figure 1 and 2: In concentration curves, both axes ranges from 0 to 1. So it would be more appropriate to draw axes of equal length. Table 3 reports a dominance test for 2004 vs. 2008, 2010 vs. 2017, and 2004 vs. 2017. However, since these are in different plots, it is not possible to compare them. Is it not possible to have one plot with all the 4 curves by each of the stratifying variable (age, area, and region)?

We have considered improving the information presented in the figures by reporting all curves by each of the stratifying variables (general population, residency area, natural area, and age group). We used the software Stata to analyze the data and obtain the plots. As the reviewer mentioned, the x-axis looks a little wider than the y-axis. The observed situation is produced by default in the statistical software and does not alter the results between 2 points. Now, we are presenting two new figures that show plots with all the four curves by each of the stratifying variables.

Minor:

5. In the results section, page 7 line 13-17, I think there is a typo ("the coastal population increased from 55.5% to 2.5%"... Corrected. Now it figures: “In 2017, the coastal population represented 55.5% of the Peruvian population (increase in 2.5% from 2004) at the expense of Andean (31.7%) and jungle (12.8%) regions reduction.”

6. In the methods, page 6 lines 26-32, in the explanation of CC, I don't understand the use of the word "benefit": Measuring inequality by means of the CCs would show greater benefit for the population with the highest expenditure levels when it is below the equity line, and, inversely, greater benefits for the population with the lowest expenditure when the curve is above the
equity line.” I would replace it with the measured outcome variable, which is the “prevalence of use of oral health services”.

We changed the word “benefit” for “percentage” in relation to the use of oral health services.