PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Inequality in the distribution of Ear Nose and Throat specialists in 15 Latin American countries: an ecological study
AUTHORS	Bright, Tess; Mújica, Oscar; Ramke, Jacqueline; Moreno, Claudia; Der, Carolina; Melendez, Amarilis; Lara Ovares, Ericka; Sandoval Domingues, Edgar; Santana Hernandez, Diego Jose; Chadha, Shelly; Silva, Juan Carlos; Penaranda, Augusto

VERSION 1 – REVIEW

REVIEWER	Christopher Waterworth University of Melbourne Australia
REVIEW RETURNED	31-Mar-2019

GENERAL COMMENTS	Being the first regional-level analysis on the availability and distribution of ENT specialists in Latin America, with a focus on the inequalities between countries, this article is both timely and important. The research aims are clear and concise with appropriate and up to date citation of past work. The article is well written and exemplary with appropriate collection and analysis of the data. The method is well structured, systematic, and clearly described allowing for replication. The study limitations are well described. Although not within the scope of this paper, future consideration should be given to the direct financial cost of ENT consultations, including differences in private vs public funding, as well as the quality of service provision. The comparisons drawn between access to ear care and eye care services are insightful, further highlighting the inequities both within and between countries, and supports the notion that governments should focus on reducing these inequities, towards achieving universal health coverage. A couple of minor amendments: 1. A small typographical error (line 24 – using author's line numbers) "and" 2. I think it would be helpful to mark the figures including acronyms, ensuring these are in line with the body of the text (for example, Figure 1. Use the same terms ie. Relative Concentration Index (RCI)).

REVIEWER	Stephen Williams Department of Otolaryngology, Alder Hey Children's Hospital, Liverpool, UK
REVIEW RETURNED	11-Apr-2019

GENERAL COMMENTS	Dear authors, Many thanks for submitting this manuscript which I enjoyed reading. It is written in an excellent style and, whilst I am not familiar with the indices employed in your analysis, I have no issues with the way they have been used. The work is ambitious in scale given, as is stated within the introduction, the high levels of diversity known to exist between Latin American countries. Whilst I think that analysing data from different countries against one another is not an unsound strategy, data from Argentina is a definite outlier and has somewhat skewed analysis. This is alluded to within the text but, from what I can gleam of the analytical methods, it has something of a knock-on effect to much of what follows. A risk when interpreting such relative figures is that the tendency is to equate those countries with the highest density of ENT specialists as the 'gold standard'. Could it be argued that countries such as Argentina or Brazil have too many ENT surgeons? Similar data (published elsewhere) from the USA is brought in for comparison but, again, do they necessary have too many or too few ENT surgeons? I think it is impossible to definitively answer either of these questions but I do think this limitation should form part of the discussion. I have some concerns regarding assumptions made during both the planning of the study and its discussion. ENT (Otorhinolaryngology) is a very diverse speciality, covering three separate organs and involving the care of both paediatric and adult patients. Whilst there are many generalists in our speciality, there are increasingly those who sub-specialise in a single area (be it Otology or something very different such as Head & Neck or Facial Plastic Surgery). As such, I find it difficult to necessary equate density of ENT surgeons with provision of ear and hearing care services. Given the rationale provided (to support an objective of considering inequalities of access to ENT specialists) is the provision of ear and hearing services, I also wish to add that - certainly where I work in the UK - the bulk of these services are not supplied by ENT (but by other healthcare professionals). Again, this is alluded to in the text but I do believe that it fundamentally affects the weight of any conclusions that are drawn from the analysis and so I do think this needs to be stressed more in the discussion. Finally, I am also keen for a greater acknowledgement that "access" to healthcare services is more commonly related to economic factors and the relative provision of public healthcare. Again, I did found this mentioned in the manuscript but it does water down the strength of the study further. Despite the limitations of the study, I do think it merits publication as, once the above points are given greater focus, I feel it provides new and useful information.

REVIEWER	Chandrashekhar t sreeramareddy International Medical University, Kuala Lumpur Malaysia
REVIEW RETURNED	11-May-2019

GENERAL COMMENTS	The authors of this paper have very lucidly described the background methods analyze and results. Methodologically very robust as they used state of the art statistical methods recommended experts in the field of health inequalities, in this case, using aggregate data where inequalities were measured for spatial variables and these are known as indices of dissimilarities. A few things need to addressed as they are minor issues only. !) authors provide a symbol for statistical sgnificance in tables 1 and 2 they missed to add a foot note for significance in table 1 but they did that for table 2. 2) On the same issue as above, i would prefer read actual p-value since most of them are significant. Signifance or 0.048 (<0.05) is not same as 0.004 or much lesser. Let the readers judge the significance and p-value be provided in both tables 1 & 2. 3) figure 4 quandrants the full names of countries could be typed in s 15 countries are well spread out across the four quadrants providing ample space without overlapping in full names are typed. 4) under discussion authors do not discuss why there is distributive inequality by capital versus rest of country and by disdvantaged regions measured by HDI. Authors provide some insight into ENT profession itself. If the ENT practice can exisit viably under either private or public sector since the ENT establishments require sophisticated instrucments, operation rooms, support staff, which also maybe short supply. Such facilities are usually available in national capitals of provincial head quarters. The same goes for opthalmology which is more sophisticated. Authors may suggest community outreach services to address the issue.

VERSION 1 – AUTHOR RESPONSE

REVIEWER: 1

Reviewer Name: Christopher Waterworth

Institution and Country: University of Melbourne Australia Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below Being the first regional-level analysis on the availability and distribution of ENT specialists in Latin America, with a focus on the inequalities between countries, this article is both timely and important. The research aims are clear and concise with appropriate and up to date citation of past work. The article is well written and exemplary with appropriate collection and analysis of the data. The method is well structured, systematic, and clearly described allowing for replication.

The study limitations are well described. Although not within the scope of this paper, future consideration should be given to the direct financial cost of ENT consultations, including differences in private vs public funding, as well as the quality of service provision.

The comparisons drawn between access to ear care and eye care services are insightful, further highlighting the inequities both within and between countries, and supports the notion that governments should focus on reducing these inequities, towards achieving universal health coverage.

Thank you very much for this feedback. We agree with the comment on financial considerations in future.

A couple of minor amendments:

A small typographical error (line 24 – using author's line numbers) "and"

Response: This correction was made on line 24 of the introduction page.

I think it would be helpful to mark the figures including acronyms, ensuring these are in line with the body of the text (for example, Figure 1. Use the same terms ie. Relative Concentration Index (RCI)).

Response: We modified used of RCI in Figure 1 and Table 1 to be consistent with the text.

REVIEWER: 2

Many thanks for submitting this manuscript which I enjoyed reading. It is written in an excellent style and, whilst I am not familiar with the indices employed in your analysis, I have no issues with the way they have been used. The work is ambitious in scale given, as is stated within the introduction, the high levels of diversity known to exist between Latin American countries.

Whilst I think that analysing data from different countries against one another is not an unsound strategy, data from Argentina is a definite outlier and has somewhat skewed analysis. This is alluded to within the text but, from what I can gleam of the analytical methods, it has something of a knock-on effect to much of what follows. A risk when interpreting such relative figures is that the tendency is to equate those countries with the highest density of ENT specialists as the 'gold standard'. Could it be argued that countries such as Argentina or Brazil have too many ENT surgeons? Similar data (published elsewhere) from the USA is brought in for comparison but, again, do they necessary have too many or too few ENT surgeons? I think it is impossible to definitively answer either of these questions but I do think this limitation should form part of the discussion.

Response: We agree in relation to Argentina being an outlier. We acknowledge in the text that the rate in Argentina inflated the regional weighted mean (in Results/Regional benchmarking p8), but no other results combine data from the countries. The main purpose of our study was to look at the magnitude of distributional inequality of ENTs, rather than the availability alone. Despite having greater availability of ENTs, the results also show that the distributive inequality in Argentina is not as high as may be expected if the ENTs were concentrated around the capital city. When benchmarking countries, the distributive inequality, as well as the availability must be considered (see Figure 1). The question about whether Argentina and Brazil have too many ENTs is an interesting one. We agree there is no definitive answer, but have added a comment to the discussion:

We acknowledge there is no definitive 'right' number of ENTs/ million population, and instead countries must consider all of these elements.

I have some concerns regarding assumptions made during both the planning of the study and its discussion. ENT (Otorhinolaryngology) is a very diverse speciality, covering three separate organs

and involving the care of both paediatric and adult patients. Whilst there are many generalists in our speciality, there are increasingly those who sub-specialise in a single area (be it Otology or something very different such as Head & Neck or Facial Plastic Surgery). As such, I find it difficult to necessary equate density of ENT surgeons with provision of ear and hearing care services. Given the rationale provided (to support an objective of considering inequalities of access to ENT specialists) is the provision of ear and hearing services, I also wish to add that - certainly where I work in the UK - the bulk of these services are not supplied by ENT (but by other healthcare professionals). Again, this is alluded to in the text but I do believe that it fundamentally affects the weight of any conclusions that are drawn from the analysis and so I do think this needs to be stressed more in the discussion.

Response: The reviewer raises an important point. In most LMIC contexts ENT specialists provide the full range of services (ear, nose, and throat). Thus, we have made an educated assumption that density of ENTs equates to provision of ear and hearing services. We have added this as a point in the discussion:

In addition, we have assumed that ENTs in LMICs deliver the full range of ear and hearing services. However, it is possible that some ENT specialists are subspecialised and provide services for only one of ears, nose or throat.

Finally, I am also keen for a greater acknowledgement that "access" to healthcare services is more commonly related to economic factors and the relative provision of public healthcare. Again, I did found this mentioned in the manuscript but it does water down the strength of the study further.

Response: We have strengthened our reflection on this point in the discussion:

While not a limitation of our study, we acknowledge that distribution of personnel is only one aspect of access to hearing care, Productivity of these personnel, as well as the quality and costs of hearing services are also important components that require attention to realise universal hearing care.27

Despite the limitations of the study, I do think it merits publication as, once the above points are given greater focus, I feel it provides new and useful information.

REVIEWER: 3

Please leave your comments for the authors below The authors of this paper have very lucidly described the background methods analyze and results. Methodologically very robust as they used state of the art statistical methods recommended experts in the field of health inequalities, in this case, using aggregate data where inequalities were measured for spatial variables and these are known as indices of dissimilarities.

A few things need to addressed as they are minor issues only.

!) authors provide a symbol for statistical sgnificance in tables 1 and 2 they missed to add a foot note for significance in table 1 but they did that for table 2.

Response: Addressing the following comment involved removing the footnote from the 2 tables, so they are now consistent.

2) On the same issue as above, i would prefer read actual p-value since most of them are significant. Signifance or 0.048 (<0.05) is not same as 0.004 or much lesser. Let the readers judge the significance and p-value be provided in both tables 1 & 2.

Response: We have used 95% confidence intervals as the measure of significance. We acknowledge there may have been some confusion, which we have attempted to address by removing the symbols from the 2 tables, and the footnote to Table 2. We have added a footnote to Table 1 to explain the use of 95% CI:

The Concentration Index departs from equity for all countries, except for Costa Rica (i.e. the confidence intervals do not overlap with zero)

3) figure 4 quandrants the full names of countries could be typed in s 15 countries are well spread out across the four quadrants providing ample space without overlapping in full names are typed.

Response: This change has been made to Figure 1.

4) under discussion authors do not discuss why there is distributive inequality by capital versus rest of country and by disadvantaged regions measured by HDI. Authors provide some insight into ENT profession itself. If the ENT practice can exist viably under either private or public sector since the ENT establishments require sophisticated instruments, operation rooms, support staff, which also maybe short supply. Such facilities are usually available in national capitals of provincial headquarters. The same goes for ophthalmology which is more sophisticated. Authors may suggest community outreach services to address the issue.

Response: In the limitations section of the discussion, we have addressed some of the authors concerns including the lack of a nuanced analysis of private versus public sector service delivery, and alternative service delivery models such as community outreach. In the first paragraph of the discussion we discuss that ENT specialist are concentrated in socially advantaged areas and capital cities. We have added a sentence to the discussion to explicitly acknowledge the comment raised.

The reasons for the concentration of ENTs in more socially advantaged areas likely include better availability of equipment, facilities, and specialist training centres.

VERSION 2 – REVIEW

REVIEWER	chandrashekhar T sreeramareddy International Medical University
REVIEW RETURNED	25-May-2019

GENERAL COMMENTS	I congratulate the authors to address all the reviewer's comments correctly. I have no further comments, will be happy see this published.