Author's response to reviews

Title: Trends in aortic aneurysm- and dissection-related mortality in the state of Sao Paulo, Brazil, 1985-2009: multiple-cause-of-death analysis

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To BMC Public Health


We would like to express our appreciation and gratitude for the comments and suggestions of the reviewers and the BMC Public Health Editorial Team.

At first, some comments about the use of linear regression. Preliminary analysis by means of linear, exponential, logarithmic and geometric regression gave equivalent significant results, with high values of the determination coefficient. Therefore, we decided to use the simples model, linear regression. The current version of the manuscript that is being submitted has used Joinpoint Regression Program, a log linear model that uses Poisson regression, as suggested by the Editorial Board of BMC Public Health.

Attending the demand of the Editorial Team, the following modifications were done:

a) As mentioned above, a Poisson regression analysis was used;

b) The tables are being included within the text file of the manuscript, after the references. However, our tables are presented in landscape forms; they would not fit in portrait forms;

c) We have addressed the comments of the reviewers and the point-by-point response is included in this letter. We have not addressed contradictory comments, such as to extend the discussion (reviewer 1 and 3) or to cut it by at least 50% (reviewer 2).

d) As far as possible, we tried to conform the manuscript with the journal style.

Considering the report of the reviewer Stefan Acosta, the following modifications were done:

Reviewer 1 (first paragraph)

Aspects on economy were excluded from the abstract and conclusions.
Reviewer 1 (second paragraph)

Our updated data regarding aortic aneurism and dissection as a leading cause of death was received directly from the National Center for Health Statistics. Besides, mainly for abdominal aortic aneurysms in older ages, several other authors have also considered these conditions as a leading cause of death: Canada, Semenciew et al, RCSP, 1992; USA, Wilmink & Quick, BJS, 1998; Canada & USA (citation) Bonamigo & Siqueira, RHCFMSP, 2003; USA (citation), Sakalihasan et al, Lancet, 2005; USA (citation) Golledge & Norman, ATVB, 2010.

Reviewer 1 (third and fourth paragraphs)

Brazil is the world's fifth largest country, both by geographical area and by population with over 192 million people. The Brazilian economy is the world's sixth largest; São Paulo, located in the southeastern region; is the most developed state among the federative units responsible for 34% by nominal GIP. The Brazilian 2010 Census revealed for the state a total population of 41,262,199 and 3,324,427 (7.84%) inhabitants over 65 years of age. In 1985 and 2009, respectively, there were 198,282 and 256,627 total deaths, and 71,738 (39.36%) and 144,635 (56.36%) deaths over 65 year of age in the state.

The above text is the first paragraph in Methods now in the revised manuscript.

Reviewer 1 (fifth and sixth paragraphs)

We fully agree with the reviewer's comment about the value of co-morbidities for the mortality related to aortic aneurysm and dissection. This fact has been critical determinant in our choice to use the methodology of multiple-cause-of-death in our studies. The percentage of autopsies in the deaths in the State of São Paulo related to aortic aneurysm and dissection was around 42%, obtained directly from the correspondent field included in the death certificate records data bank. These figures are surprising even for us and render a greater quality to our data. Nevertheless, we have some difficulty to agree with the doubt regarding the high proportion of aortic aneurysm and dissection identified as the underlying cause-of-death. We adopt the WHO concept of underlying cause-of-death, defined as "(a) the disease of injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident
or violence which produced the fatal injury”. We know that some autopsy pathologists do not follow this concept. The high proportion of aortic aneurysm and dissection deaths identified as an underlying cause is consistent with the study results of Gillum in the United States and Filipovic, Goldacre, Roberts, Yeates, Duncan and Cook-Mozaffari in England and Wales. We have also referred to the only known papers that have considered the accuracy and trustworthy of mortality statistics related to aortic aneurysm and dissection that confirm the high standards of confidence of these data.

Reviewer 1 (First specific comment)

The word "secular" was excluded from the title of the manuscript.

Reviewer 1 (Second specific comment)

We were not able to identify the doubt on line 5 of the first paragraph of results: " Over the time period from 1985 to 2009, among residents of the state of São Paulo, 42,615 deaths related to dissection and aortic aneurysms occurred, of which 36,088 (84.7%) were identified to be the underlying cause and 6,527 (15.3%) an associated (non-underlying) cause of death, corresponding, respectively, to the averaged age-standardized death rates of 6.58, 5.53 and 1.05 deaths per 100,000 population."

Considering the report of the reviewer Janet Powell, the following modifications were done:

Reviewer 2 (first paragraph)

We are supposing that the secondary mentions noticed in the reviewer’s report refer to aortic aneurysm and dissection as associated (non-underlying cause-of-death). Of course, besides aortic aneurysm and dissection, it would have been possible to study all other associated causes mentioned in those 6,527 deaths whose underlying causes are shown on Table 4. A similar list, as the one used to study the associated causes of aortic aneurysm and dissection as an underlying cause, as done on Table 3, might be used and we would receive an equivalent distribution of causes, including "surgical operations and other surgical procedures" and "complications of surgical and medical care". Nevertheless, such associated causes of death would be linked to all the underlying causes displayed on Table 4, i.e., Chagas disease, malignant neoplasms, diabetes
mellitus, hypertensive disease and so on, until external causes of death. We must also remember that the codes used to identify causes of death are from the International Classification of Diseases, where surgical and medical procedures are recognized by means of general and unspecific characteristics that do not identify the condition that was treated. The International Classification of Health Interventions (ICHI), that succeeded the International Classification of Procedures in Medicine (ICPM) is not used for coding causes of death. Therefore, we would not be able to identify the surgical operation, if due to treat an aneurysm and dissection or else Chagas' disease, neoplasm or a fracture from an accidental fall, and so on. Additionally, regarding interval of time elapsed from an eventual operation and death, it is known that only one per cent of death certificates include such a period of time between causes listed on the lines of Part I and Part II of the International Form of Medical Certificate of Cause of Death. In conclusion, the operative mortality related to aortic aneurysm and dissection, while an important feature, needs to be addressed, but unfortunately not by means of death certificates exclusively.

Reviewer 2 (second paragraph)

In our opinion, the changes that are shown in Figure 3 are related to the introduction of the fourth line in Part I of the International Form of Medical Certificate of Cause of Death. This text had been already included in the manuscript.

Reviewer 2 (third paragraph)

We have followed the analysis method that have been done for the seasonality of aortic aneurysm and dissection in the papers found in the literature on the matter. A list of these papers may be obtained with the authors.

Reviewer 2 (fourth paragraph)

The rates in figure 6, about aortic aneurysm and dissection according to Regional Health Directions in the state of São Paulo, have been standardized.

Reviewer 2 (fifth paragraph)
Taking into account the comment about the discussion being rambling, we have carefully analyzed its structure. We could ascertain that the paragraphs of the discussion orderly and logically follow the data shown in results.

Considering the report of the reviewer Edward Choke, the following modifications were done:

Reviewer 3 (First paragraph)

The authors would like to thank the reviewer for this comment and also congratulate for his recent published paper on the mortality from abdominal aortic aneurysm. We can very well understand his concern about the current state of abdominal aortic aneurysm mortality trends. Therefore, we also would like the expose some arguments to justify the objectives of our manuscript. This is the first study in Brazil (and to our knowledge in Latin America), mainly with a epidemiological perspective (instead of clinical) to describe mortality trends of all the range of conditions included as aortic aneurysm and dissection with the use of multiple-cause-of-death methodology. Such data were not known among us, contrasting to England & Wales, where the studies of Fowkes, Macintyre and Ruckey and of Filipovic, Goldacre, Roberts, Yeates, Duncan and Mozaffari have before shed light on the epidemiology of aortic aneurysm and dissection. The authors have not missed the importance of abdominal aortic aneurysm; but aimed mainly to see the forest in spite of the trees.

On the other hand, the reviewer's comments were also taken into account during the analysis of the data with a Poisson regression program, revealing changes in the mortality trends of aortic aneurysm and dissection.

Reviewer 3 (Second paragraph)

With the humble ponderation as to the best of our knowledge, the few papers mentioned in the Introduction refer strictly to population-based studies that have taken into account all range of aortic aneurysm and dissection subcategories, as included in the categories 441 and 171 respectively from ICD-9 and ICD-10. The spate of publications noticed in the reviewers comment have studied the mortality only from abdominal aortic aneurysm in Australia (Norman JVS 2011), New Zealand (Sandiford BJS 2011), England & Wales and Scotland (Anjun EJVES 2012) and England &Wales (Choke, Circulation,
2012), and more recently in New Zealand (Nair, NZMJ 2012) and England & Wales (Anjun, BJS 2012). We deeply regret not having time and space to pay homage in the current manuscript to all the authors that have given their valuable contribution to the study of abdominal aortic aneurysms.

Reviewer 3 (First discretionary revision)

In Brazil, mortality statistics are coordinated by the Ministry of Health, consolidating the National Mortality Information System. Mortality statistics are derived from death certificates, which are provided by physicians or are created based on witness statements, requiring notarization in either case. Copies of the death certificates are sent to the state bureaus of vital statistics or departments of epidemiological surveillance, where the demographic and medical data are encoded and processed, the resulting data sets then being forwarded to the Brazilian Ministry of Health for consolidation at the national level. The WHO form of the medical death certificate is used in the entire country. The final statistics are available on-line at the site of the Information Department of the Unified Health System (DATASUS) (http://www2.datasus.gov.br/DATASUS/index.php?area=0205&VObj=http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sim/cnv/obt10), as well as original data bank in compressed files (http://tabnet.datasus.gov.br/tabdata/sim/dados/cid10_indice.htm). In a related site it is possible to see the screen of the International Form of Medical Certificate of Cause of Death that receive cause-of-death codes for the direct automatic on-line processing of causes all over the country (http://200.19.222.1/scb_local/scb.asp).

The activities related to the compilation of statistics are decentralized. The offices of civil registration and health surveillance at the municipalities receive copies of the death certificate. At the health surveillance office the items of the death certificate begin to be coded. At this level queries about inadequate causes of death may be done by the coder or by health officers, for instance for ill-defined causes of death. All women deaths of fertile age are scrutinized looking for maternal deaths; and depending of the local, other surveillance activities may take place, like for infant deaths. These coded data and a copy of the death certificate are sent to the state level; in São Paulo the SEADE Foundation.
One important municipality in the State of São Paulo is the capital. With near twelve million inhabitants, over two hundred deaths occur every day. All these deaths are coded and processed daily for surveillance activities in an office of the city Secretary of Health.

We must remember that the SEADE Foundation was the first local outside the United States to use the Automated Classification of Medial Entities System. Therefore multiple-cause-of-death data are available in São Paulo since 1983. At the SEADE all the death certificates from the state are double coded and quality control activities continue to take place. This means that experienced coders are able to code multiple-cause-of-death and are working since the beginning of this activity. New queries may be sent to physicians, all reports from the surveillance of women at fertile age are reviewed, violent deaths are questioned and special surveillance for AIDS deaths. At this stage rigorous review of the resultant data processing is nowadays done by an advisor that worked previously in the WHO Collaborating Centre for Classification of Diseases in Portuguese for more than twenty five years.

Please refer to the papers of Mathers and França, included as references 58 and 59 in the original submission of the manuscript. These papers had also as co-authors Rao and Lopes as in the Mahapatra's paper. As an appendix to França's paper, specific about the Brazilian mortality information system, a list of selected studies about the quality of mortality statistics in Brazil. Also, as reference 17, 21, 23, 25, 26, 27, 28, 29, 35 and 60, another papers of one of the authors (AHS) of the current manuscript about other aspects of mortality statistics and automated processing of causes-of-death in Brazil.

Therefore we have not modified the manuscript text about this issue.

Reviewer 3 (minor essential revision)

All comments were considered: one decimal point was included in tables; except for some data when two decimal points were needed to discriminate and compare between variables; the number of tables were corrected; the color of the graphs changed and p values indicated.

Respectfully,
Augusto Hasjak Santo