Author’s response to reviews

Title: National mortality burden due to communicable, non-communicable, and other diseases in Ethiopia, 1990-2015: findings from the Global Burden of Disease Study 2015

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Reviewer #1:

Mortality burden due to communicable, non-communicable and other diseases in Ethiopia: Findings from the 2013 Global Burden of Diseases study

Introduction

This paper presents a detailed summary of the GBD 2013 results for mortality and YLLs in Ethiopia, and describes trends in the burden of disease in this country since 1990. It uses standard GBD methods and provides a strong description of the epidemiological transition as it has unfolded in Ethiopia. Although it presents no methodological advances or methods, its description of burden of disease in Ethiopia will be of interest to health policy makers and researchers studying the epidemiological transition.

Response: The authors would like to thank the reviewers for their constructive comments to improve this manuscript. The authors used GBD 2015 estimates and addressed the comments point by point as shown below. The authors addressed the comments in the text, figures and tables and showed with track changes, underline or yellow highlighted in the documents based on the instructions given.

Major comments

Need for English edit

The English is unacceptable, and needs to be significantly improved before publication – I recommend a thorough edit by a native English speaker or professional editing company.

Response: The authors have tried to edit the language by themselves. The authors did not secure any funding to write this manuscript and volunteers declined to give their support. The authors would like to get editors support or suggestion if there are volunteer language editors or any funding source for such language editing. We preferred to submit the paper not to get delay.
Presentation of ranks and proportions

The discussion includes mention of some rankings of disease burden, but this is not presented comprehensively in the results. It would be helpful for the reader to see a comparison of rankings of the major causes of disease in 1990 and 2013, and how these rankings have changed.

It would also be useful to see how the proportion of total YLLs has shifted from infectious to non-communicable disease – it is possible that although total burden due to these causes has decreased, their importance relative to one another has not changed significantly. Presentation of these proportions over time (and the ranking of causes) will help us to better understand how the health challenges facing Ethiopia have changed.

Response: The authors would like to appreciate for this comment, we have accepted this comment and included Figure 4 and 5. We have fully described in the text with line (489-494, 530-535). “As indicated in Figure 4, the first 10 leading causes accounted more than 50% of the total age-standardized death rates in 2015. Six of the ten leading causes were in the NCDs category. The first five leading causes respectively Ischemic heart disease, Lower respiratory disease, Diarrheal disease, Tuberculosis and Hemorrhagic stroke caused 141.9 (95% UI; 92.3-208.0), 98.7 (95% UI; 67.5-139.8), 88.6 (95% UI; 59.4-127.1), 86.3 (95% UI; 47.0-138.6), 62.7 (95% UI; 37.9-94.9) per 100,000 people (Figure 4 and Table 2)

“The first 10 leading causes accounted 45% of the total age-standardized YLL rates in 2015 as shown in Figure 5. Seven of the ten leading causes were in the CMNN category. The first five leading causes respectively were Lower respiratory disease, Diarrheal disease, Tuberculosis, Ischemic heart disease and HIV/AIDS caused 2987.2 (95% UI; 2165.5-4017.9), 2502.3 (95% UI; 1410.4-4151.9), 2405.2 (95% UI; 1676.8-3309.1), 2380.3(95% UI; 1446.5-3680.0), 1236.9(95% UI; 861.1-1623.3) per 100,000 people (Figure 5 and Table 4)”

Description of uncertainty

The authors mention several times that cause of death data is not well collected in Ethiopia, and that the GBD results relied on combination of cause of death data from multiple sources. It would be instructive to show information on the degree of variation between these sources and the total level of uncertainty in cause of death estimates. It would also be useful to see the effect of garbage code redistribution on these causes of death – what proportion of the total cause of death in major causes is due to garbage code redistribution, and how much does this vary between causes? Given there have been major declines in some significant causes, is it possible that a different garbage code redistribution strategy could have led to radically different
conclusions about the nature of the trends in Ethiopia? It would be helpful if the authors could present some information about this problem, and also discuss its importance in greater detail in the discussion section.

Response: The authors would like to thank again for this comment, the authors have annexed the data sources and included the 95% uncertainty interval that may also show the relative sparse of data in GBD 2015 for Ethiopia. In causes of death estimation for Ethiopia, GBD 2015 used verbal autopsy (as we explained in the data source supplementary appendix) and in the causes of death estimation process with lack of data, especially for any location year that we have sparse data, GBD 2015 used two another factors. First for each causes, covariates were used that help to estimate better (look to capstone paper), second GBD 2015 browed strength from region and super region in the modeling process. About the garbage codes because GBD 2015 data source for this country were verbal autopsy not vital registration then effects of garbage code in the estimation of causes of death was very low. Garbage code effect usually comes from vital registration. In addition in the Eastern SSA there are no vital registration (except some old vital registration from Madagascar). In the SSA as a super region for Ethiopia except of South Africa there are not any vital registration. Because mostly all the data are VA and VA data is some type of stochastic data then Nosie reduction process may have important effect.

Regional comparisons

A comparison of trends and levels in key causes with the sub-region and region in which Ethiopia is situated, and perhaps also with its neighboring countries, would help to give a sense of how much Ethiopia’s health situation differs from, and in what areas its progress exceeds or lags, that of its regional neighbors. Presented as they are, the results do not give us a sense of the scale of Ethiopia’s health achievements, and how they compare with other countries in the region. Despite

Response: We have included figure 6, 7 and 8 to show comparison between Eastern Africa countries with their ranks of causes of death in age-standardized death rate and premature mortality. We have included top 5 leading causes of age-standardized YLL rates for Ethiopia in 2015 and compared it with the Sub-Saharan Africa region and Eastern Sub-Saharan region. We have described in the text in Line 541-544.

“Trends of five leading causes of age-standardized YLL rates for Ethiopia generally showed more declining except ischemic heart disease compared with Eastern Sub-Saharan Africa sub-region and Sub-Saharan Africa region as indicated in Figure 6. The ranks of diseases in Eastern Sub-Saharan Africa countries as measured in age-standardized death rate and YLL rate per 100,000 people showed major variations as indicated in Figure 7 and 8. Lower respiratory tract infection is the first leading causes of age-standardized YLL rate in Burundi, Rwanda, Tanzania and Uganda; and Ischemic heart disease was for Ethiopia and Zambia”.
More critical discussion

Some of the discussion points provide uncritical praise of the Ethiopian government’s achievements in reducing burden of disease. While the Ethiopian health system has no doubt had its achievements, it is more helpful for the journal’s audience if we can read about which areas health policy is failed, and what aspects of health in Ethiopia are struggling. A more critical appraisal of the government’s health policy would be useful to inform future directions in health policy (and would also be better informed by comparison with neighboring countries).

It appears, for example, that HIV policy has not been effective in Ethiopia – but there is no discussion of where this policy has gone wrong or what might need to be done. There is also no discussion of the importance of improved vital registration systems and other elements of human security that are crucial both to better health and to better monitoring of health. In a paper that describes the challenges of data analysis in Ethiopia in the introduction and abstract, it would be useful if the discussion could include recommendations for improvement in data collection, and in particular strong calls for progress towards full vital registration.

Response: The authors have accepted this comment and critically discussed the findings. We have included poor achievements of the country on maternal and infant mortality rates in the discussion with evidence. However, there is no effectiveness evaluation study showing either HIV, TB or malaria policies were effective or not to include in this discussion.

“Despite all these success, Ethiopia did not achieve the reduction of maternal mortality (MDG-5) and infant mortality rates. Cost effective and proven strategies to reduce maternal and infant mortality such as skilled birth attended delivery coverage is below 30% in 2016 for the country”

We have modified the recommendations to improve data collection and described in the discussion “There is critical need to make sure that the existing health information system captures NCDs, strengthening surveillance systems and surveys towards NCDs, improve overall data collection and progress towards full vital registration in the country”

Reviewer #2: This paper sets out to describe the mortality burden in Ethiopia, using estimates from GBD 2013. There are some minor points that need tidying up before it can be accepted for publication.
In several places the GBD 2013 outputs are described as "data" or "results", which are misleading as they are in fact estimates coming out of the GBD 2013 model on the basis of a range of source data and should be described as such.

Response: Thanks, we have used the term “estimate” to be consistent.

The basic methods used are those already used for the worldwide GBD 2013 exercise, which are generally satisfactory. Unfortunately, as with much GBD work, the globally recognized International Classification of Diseases (ICD) coding system is not used to characterize disease entities, and this is a weakness of the paper, making direct comparisons with other material difficult.

Response: We have sited GBD works in the method section for readers to consider GBD hierarchical classifications.

Here the GBD 2013 estimates for Ethiopia are taken in isolation, but there is no discussion of possible problems associated with this approach. You mention "make use of sophisticated modeling techniques to borrow strength across geography", and I see this is a potential concern for Ethiopia, which happens to be surrounded by a number of territories with poorly-performing health systems. Is it possible to quantify - or exclude - any such effects? Is it possible to re-run the GBD 2013 model for Ethiopia only (i.e. using only in-country source data)?

Response: The authors would like to thank for this comment, as we responded with the first reviewer, we have explained the data sources (see supplementary appendix). First GBD modelling is getting strength not only from region, but also from supper region that is whole Sub-Saharan Africa, and in the supper region we have good data including VA and VR. Second we are using covariates (around 80 for 1990-2015 and all countries) then these are very helpful for GBD 2015 estimation.

I would challenge the statement in line 53 about being "critically important to track progress in the HSTP" - that can only be properly be done using in-country data, not externally derived estimates - although GBD estimates may offer some clues.

Response: The authors would agree with this comment in the sense that in-country data collection should get emphasis to measure national strategic plans than model derived estimates. We have modified the statement.

I don't understand "achieve 509 age-standardized mortality rate" in line 41
Response: Thanks again, there were no indicators showing NCDs in the previous plans and this is to mention an indicator on NCDs from the national envisioning plan. The authors have modified the statement to be clear with the readers (line 120).

Line 144 - age-standardized against what standard? This is very important to understand in the Ethiopian context of increasing life expectancy over the period of observation.

Response: thanks for this comment, you mentioned a very important point which was already described in the methods section under “Descriptions of scenarios used to estimate rates” subsection.

There is confusion in the text about the increasing proportion of NCD mortality versus the decreasing NCD mortality rate as shown in Figure 1. In fact Figure 1 shows a very healthy development over time, with all three categories and total mortality decreasing. Should we worry about the proportion of NCD increasing, particularly alongside increasing life expectancy and the implication that more people are surviving into the age groups where NCD mortality naturally increases?

Response: we have accepted this comment and included proportion statements from the text and modified the statement as “All three categories and total mortality rates were decreasing from 1990 to 2015. Non-communicable diseases were leading causes of age-standardized death rate causing 711 per 100,000 people in 2015 as indicated in Figure 1” line 467-469

The legends for Figs 2 and 3 are unclear.

Response: we have modified the legends for Figure 2 and 3