Author’s response to reviews

Title: Myanmar mortality registration: an assessment for system improvement

Authors:
Myitzu Tin Oung (myitzu@gmail.com)
Kerry Richter (krichter99@gmail.com)
Pramote Prasartkul (pramote.pra@mahidol.ac.th)
Viroj Tangcharoensathien (virojm16@hotmail.com; viroj@ihpp.thaigov.net)

Version: 1 Date: 06 Feb 2017

Author’s response to reviews:

Reviewer reports:

Reviewer #1: Overall comments

This paper reads well and is informative, but the presentation of the materials included can still be improved to help to clarify their interpretation by a broader audience.

The paper would gain greatly in emphasizing more prominently the comparison and evaluation of VRS deaths both at the national level, and subnational level for both sexes and by sex, as well as by broad age groups the death registration using the (unadjusted) household deaths (and associated mortality rates) from the 2014 census.

More specific comments

1. Page 4 para 3 line 52: this statement is too strong and inaccurate. Several surveys over the past 1-2 decades have been collecting mortality data based on household deaths and children survival. See Myanmar in "Other Sources" datasheet in "Data inventory for information on the availability of data relevant for the estimation of adult and child mortality for each of the 201 countries or areas with at least 90,000 inhabitants in 2015" from the UN (2015). World Mortality Report 2015.

“Hence, the VRS compiled by the Central Statistical Organization (CSO) becomes the main source of mortality statistics of the country including cause of death information, which can generate mortality profiles of the population on a continuous basis at the national as well as at the local level.” (Page 4 para 3)

2. Page 5 para 1: specify if any areas/regions not covered? What about specific population subgroups/minorities in the spirit of the SDGs to leave no one behind, and to be as inclusive as possible.

“Currently, the VRS covers 321 towns in urban areas and 287 townships in rural areas [10, 11]. The coverage of the VRS in Myanmar is over 97% while a total of nine townships, three from Sagaing Region and six from Shan State, do not report vital information to the CSO for being geographically hard-to-reach areas.” (Page 5 para 1)

3. Page 6 para 2 and page 12 para 3 about Brass Growth Balance (BGB): issue with violation of assumptions, especially at subnational level. Clearly based on your comparison with census mortality the BGB results are implausibly too low due to violation of assumptions. A more meaningful comparison of VRS mortality rates and/or death counts would be with deaths from households from the census. Actually you are doing part of this comparison in your paper, but do not really introduce this approach. In Myanmar context, this comparison is far more meaningful, and potentially robust than the BGB and its very strong assumptions. Present also these results at subnational level, more meaningful to understand the situation in the country, and potential for further improvements/priorities.

Comparison with deaths from the census (at national and sub-national level) was done in the revised version of the manuscript, with both raw data and adjusted mortality indicators.
4. Page 8 Figure 1, page 9 figure 2: compare the 3 sources by sex (2 plots) instead of by source (3 plots) as currently, too difficult to see the differences.

Revised

5. Page 13 end of para 1: add a table and scatter plot comparing death counts from VRS and from census overall, by sex and subnational units.

Firstly, the journal allows 4 figures and the manuscript has already had 4 figures.

Secondly, the comparison between two data sources has already been made with reported deaths (unadjusted) and adjusted mortality estimates. The author believed that the table of death counts from VRS and from census cannot provide additional information.

The fact that author learned from the table and plot is in Yangon Region, the registered number of deaths was more than the reported deaths and other states and regions, the reported deaths were higher than the registered deaths in both sexes.

<end>

Reviewer #2: Assessment of the quality of vital statistics produced by the Myanmar CRVS system is a topic of interest given the paucity of reliable mortality data in this country. However I have strong reservations about the approach employed by the authors to measure the completeness of death registration in Myanmar, and their interpretation of subnational mortality results. Given that measurement of the completeness of death registration is the primary finding in this paper, the recommendation is to not accept the paper for publication.

The use of the Brass Growth Balance method to estimate completeness of death registration is not appropriate for Myanmar. As noted by the authors, the method is reliant upon there being a stable population (i.e. constant population growth rates). However, in Myanmar the rate of population growth has fallen substantially in recent decades, from 2.22%pa in 1980-85 to 0.82%pa in 2010-15. This clearly will introduce biases into the resultant completeness estimate. Other estimates by both the United Nations and Global Burden of Disease for Myanmar are of approximately 400,000 deaths per annum, suggesting completeness of death registration of approximately 50%. These approaches, which utilise available mortality estimates from censuses
and surveys and model life tables are more reliable than those produced by an inappropriate method such as the Brass Growth Balance method. While it is recognised that the lack of recent censuses prevents application of the more reliable intercensal methods (e.g. Generalised Growth Balance method, Bennett-Horiuchi method), this does not validate use of the Brass Growth Balance method.

I would like to say that this assessment was applied to show that the Myanmar VRS has problems in data quality and needs improvement to produce reliable mortality indicators. The assessment of completeness of death registration is one of the components in the study. As I mentioned in the manuscript, I agree the estimate produced by the methods cannot be regarded as the exact level of completeness of death registration in Myanmar and cannot be used as a correction factor to estimate reliable mortality indicators. However, this finding can be used to raise political awareness to implement improvement strategies of the Myanmar VRS by indicating severe under-registration of deaths and poor quality COD information in the VRS. In addition, to produce a reliable mortality indicator, the completeness should have at least 60% completeness. Therefore, the completeness less than 60% of death registration in the VRS cannot be useful for further application although we cannot generate the exact level of completeness of death registration based on the method.

Although it is recognized that the BGB method is not the best method to assess the completeness of death registration in Myanmar context, this can produce rough estimate of the completeness based on the following argument “the method is quite robust to the violation of the assumption of population stability if there are no sudden changes in fertility and mortality (UN, 1983).” In the revised manuscript, I added another Death Distribution method (the Preston and Coale method) to validate the result although each method has its own limitations.

Specific comments:

1. p4 - The vital registration system is not the only source of mortality statistics in Myanmar - there are the DHS and census that produce child mortality estimates.

Revised

2. p5 - Why use 2014 Census population with 2013 registered deaths? Consistent time periods for both numerator and denominator should be utilised.
“The mid-year population for 2013 to calculate mortality indicators was estimated from the numbers of population collected in 2014 census by applying the annual population growth rate of 0.89% (DOP, 2015).”

The information was added in the methodology section “Preparation for the assessment of the quality of mortality data from the VRS”

3. p6 - Brass Growth Balance is one of a number of death distribution methods, not the only death distribution method.

In the revised version of the manuscript, both death distribution methods were applied to estimate the completeness of death registration.

4. p7 - The 2014 census publication also appeared to use Brass Growth Balance, so their CDR estimate is flawed.

As the country does not have reliable and accurate data sources, the authors have to use all available sources of mortality information. However, the aim of the study is not to estimate mortality indicators from the VRS but to highlight the problems in the quality of mortality data.

5. p7 - WHO and UN estimates were mentioned by the authors, however the estimate from the Brass Growth Balance method appears to have been taken as the more reliable.

In fact, I think that all the methods applied in this study are less reliable compared with the direct matching technique due to their assumptions. However, we can only use such indirect demographic methods to assess the completeness due to limited resources.

Frankly saying, while I was writing the first manuscript before getting comments from the reviewer, I did not recognize which method can produce more reliable estimate. In this revised manuscript, I did not report the Brass’ estimate as more reliable estimate.
6. p8 - It is mentioned that rural areas should have higher CDR than urban areas, however this is a generalisation. Overall, they should have higher age-specific death rates however the crude death rate can be lower if rural areas have a much younger age structure. Table 1 should compare age-standardised death rates between states and regions, which would provide a better indication of the extent of under-registration at the sub-national level.

The CDR of rural areas in the VRS (3.0) is implausibly low to be true for a developing country.

The CDR in rural areas is historically higher than urban areas in Myanmar (CDRs of rural areas estimated by CSO for ten year periods were consistently higher than CDRs of urban areas, 8.0 in rural areas and 6.9 in urban areas in 2013.)

To know the rough estimate of the extent of under-registration of deaths at the sub-national level, the mortality indicators by region reported in the census was applied (Table 3).

7. p10 - Comparison should also be made to the Global Burden of Disease estimates for Myanmar, rather than those for the SEA region which includes countries with a wide range of mortality rates.

Table 3 - should mention that it excludes ill-defined causes.

Revised

8. p14 - The paper could expand further on why death registration is higher for males than females.

Revised.

In the revised manuscript, it is reported that

“The Death Distribution methods provided the slightly lower percentage of completeness of death registration among female than male deaths with seven percent difference. …..The similar levels (slightly lower) and patterns of male and female mortality between two data
sources, such as the 2013 VRS and the 2014 census, did not support the finding of higher under-registration of female deaths than male deaths. In addition, the previous findings suggest excess male mortality in the country in the middle age groups which is higher than the international estimates. A direct matching technique, known as a dual records system, should be applied to confirm this finding because the method can provide a more accurate estimate of completeness. It is necessary to explore the underlying problems for under-registration of female deaths for the development of improvement strategies if the problem exists.” (page 18, para 1)

9. p15 - This section could expand on how verbal autopsy could be rolled out for use in producing reliable cause of death statistics in Myanmar.

Revised

“Application of standard verbal autopsy tools for deaths occurring outside health facilities can also improve the quality of COD [36] that can be achieved by providing trainings on verbal autopsy process to midwives who are collecting vital information in the communities.” (page 19, para 1)

Reviewer #3: Reviewer report

Title: Myanmar mortality registration: an assessment for system improvement

Reviewer: Chalapati Rao

General comments

This article provides a descriptive analysis of the current status of vital statistics from the national death registration system in Myanmar. The findings from the statistical analysis confirm previous assessments of the quality of data from the Myanmar national mortality statistics system. However, some more direct evidence is required regarding data quality, as well as a more objective assessment of the operational characteristics of the processes for death registration and compilation of vital statistics. These would provide a basis for a set of concrete recommendations to ‘improve’ the system, as seems to be the intention of the article, from its title.
Major revisions

1. The paper makes several comparisons with data from the 2014 Census, which to some extent considers that the 2014 Census is a more reliable data source for all-cause mortality measurement. The Methods section should include a paragraph describing the methodology of mortality data collection in the Census 2014.

The references which described the methodology of mortality data collection in the 2014 census was mentioned in the revised manuscript.

2. Estimates from the UN and US Census Bureau should also be qualified with a brief description of their methodology, and most importantly, the data sources from Myanmar that were utilised in such estimation, and if such information on data sources or methodology for estimation is not available, this should be mentioned.

The references which described the methodology for mortality estimates and COD information from the UN, US Census Bureau and the WHO was mentioned in the revised manuscript.

3. Table 1 should present directly comparable numbers. i.e the CDR from VRS should be compared with the CDR from the 2014 Census, and so on. This will provide direct evidence of potential under-reporting in the VRS. Similarly, the U5MR, adult mortality (risk of dying between 15 and 60 years), expectation of life at age 60 years, and life expectancy at birth should all be presented from the VRS 2013, as well Census 2014; for both sexes, and at national and state level.

To simplify presentation, there could be a separate table each for males and females. And, data could be compared across urban and rural areas. To solve issues of space (if any) some of this material could be presented in a web appendix file, but these findings will identify specific states/regions that need to be targeted for improvement, which should be discussed in the article.

Revision was done and presented in Table 3

(The table was presented with CDR, IMR and U5MR by sex, by urban and rural and by region calculated from the VRS and compared with census adjusted mortality indicators and also percent completeness of death registration based on census data. However, the CDR by region from the census is not available by gender and by urban rural. These are only available at the national level)
4. Figure 1: The log plots of age-specific mortality rates should be presented as overlapping line graphs separately for males and females, with each graph having a line of ASMRS from each of the three sources, in different colours or styles (dotted/dashed etc). This will enable a clear appreciation of the trend and magnitude of differences in mortality patterns across the three sources, and relevant observations should be documented in the text.

Revised the figure

5. Figure 2: The three sources used in the comparison here should be the same as the three sources used in Figure 1. This will enable a clear understanding of the links between figures 1 and 2, and the interpretations there in.

Revised the figure

6. Figure 3: The gender differences in the 2014 Census mortality data need to be discussed in more detail, and this will be supported by the findings presented in the revisions to Table 1 as recommended above. This is required because the Census 2014 mortality data, as mentioned in Comment 1, seems to represent a more accurate pattern of mortality in Myanmar. The gender differentials observed in Figure 3 should be explored further as to whether there is likelihood of some differences (more than observed from the historical data) being a true phenomenon, since they are also present in the more complete data from Census 2014. Or else, do the findings from both VRS 2013 and Census 2014 suggest that there are possibly some underlying societal or administrative reasons for such under-reporting / registration of female mortality. These issues should be discussed in detail.

The similar pattern of male and female mortality and gender difference (Figure 1, 2 and 3) found in both VRS and Census suggests that the possible higher male mortality in the country rather than under-registration of female deaths. This can be confirmed only if another complete and reliable data source is available. Or direct matching technique can be applied to confirm under-registration of female deaths.
Revised in the manuscript accordingly

7. Tables 2 and 3. The observed higher proportions of Group 2 mortality are more likely to be due to the severe-under-registration of child deaths, which are largely from neonatal conditions (prematurity/low birth weight/birth asphyxia/birth trauma); and infectious diseases (pneumonia, diarrhoeal diseases, and malaria). Very low representation of these deaths in the data result in the observed higher proportions of NCD mortality, and not the 'over-registration' of NCD deaths. Such 'over-registration' can only be demonstrated through a validation exercise that identifies misclassification patterns of Group 1 deaths to NCDs. The text referring to this aspect on pages 10-12 as well as in the discussion should reflect the observed skew to be largely due to under-registration of infant and child deaths.

According to the findings on age distribution of three broad groups COD, the percent distribution of Group I, II and III COD in the youngest age group shows similar level and pattern with WHO estimate of COD for Myanmar. All the findings indicate higher proportion of Group II COD in most of the age groups. So we assumed that this higher proportion of NCD is due to poor quality COD certification in which most of the deaths occurred in the community are assigned as NCD.

8. Table 3: The footnote to Table 3 suggests that the proportions have been calculated using the denominator of deaths with 'proper' codes i.e 156,352. This is a misrepresentation of the proportional mortality patterns by cause in the VRS 2013. The proportions presented for specific causes should be calculated using the total deaths in the VRS data as the denominator; i.e 199,491.

Revised (the proportions was calculated again by using total deaths in the denominator)

9. Figure 3: The age-patterns should be presented separately for males and females. Each graph should present overlapping lines for each cause group from each of the two sources in different colour or style; to readily observe the differences in age patterns across the two sources, and present their observations accordingly. The authors could look at Figure 1 in the following reference, as an example of such data representation.

While the Turkish figure compares urban and rural patterns, the figure in this article could compare the VRS 2013 proportions with the WHO Estimates, for males and females respectively.

Revised the figure as suggested. I assume that the reviewer means Figure 4, not Figure 3, because it was mentioned “each cause group from each of the two sources”

10. The Brass Growth Balance method estimates registration completeness only at ages above 5 years, and does not account for completeness of under-5 mortality data.

This should be mentioned and discussed carefully, when comparing findings from the Brass method with the UNICEF, which possibly only estimates birth registration completeness, and not death registration completeness at all ages. Hence, these measures may not be directly comparable.

Revised (Page 6; Under “Assessment methods”; para 3)

The estimate from the UNICEF Myanmar Country Office was for death registration, not birth registration. However, the published report did not mention about the methodology and data source. Thus, this estimate was removed from the manuscript.

11. The recommendations for system improvement presented in the discussion need to be linked and targeted to the specific findings in the results, particularly in regard to administrative, technical and societal aspects of death registration and compilation of mortality statistics.

In this study, we assessed the quality of mortality data from the VRS. The main findings in this study are under-registration of deaths in rural areas, among under-five children and in difficult to access regions and poor quality of COD data with high proportion of ill-defined COD.
The recommendations in this study are based on those findings such as social mobilization to increase public awareness, legislation and enforcement of a vital registration law, the requirement of a death certificate as a condition to gain a burial or cremation approval to improve the completeness of death registration; on-the-job training for registrars including certification of COD and application of standard verbal autopsy tools for deaths occurring outside to ensure the quality of COD.

Together with this assessment of quality of mortality data, we conducted a qualitative study in two selected townships to identify problems in death registration operations in regard to administrative, technical and societal aspects. Those findings will be presented in another manuscript with relevant recommendations.

12. Reference 14 is the main source for the methodology used in this study, and is also cited in several locations to substantiate findings and interpretations. A web link should be included for readers to readily access this document.

Revised


Please also take a moment to check our website at http://pohm.edmgr.com/l.asp?i=5443&l=ZIY7IR7M for any additional comments that were saved as attachments. Please note that as Population Health Metrics has a policy of open peer review, you will be able to see the names of the reviewers.