Author’s response to reviews

Title: Socio-economic and demographic Determinants of Under-five Mortality in rural northern Ghana

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Version: 3 Date: 30 July 2014

Author’s response to reviews: see over
Dear Editor,

We are grateful for your consideration of our manuscript. The thorough review with helpful comments and queries from reviewers are well appreciated. Below are point by point responses to their comments and concerns.

Response to reviewer’s comments

Reviewer: Anita McGahan
Reviewer's report:
Thank you for the opportunity to read this important article. As I read through it, several opportunities for its development came to mind:

1. Is the result regarding polygamy attributable to an increase in knowledge in the Mother’s immediate community or the availability of multiple care-givers?
I wonder if there’s any way to discern this in the survey, perhaps by analyzing separately the likelihood of under-five death among mothers based on the numbers of children in their households born to co-wives (i.e., on the theory that many prior children in the household would point to the importance of co-wife knowledge whereas fewer prior children would point to the importance of available alternative care-givers).

Response: Thanks for this enquiry, unfortunately the data set from our survey do not make provision for the numbers of children born to co-wives in the same households hence we are not able to make this comparison however, a good proportion of the mothers (80.7%) in polygamous unions where found not to be educated. Also as natives from the study area we attribute the strong relationship between under-five death and polygamy on the unpleasant rivalry between co-wives and the huge dependency on one bread winner by multiple women and children for very limited resources in this already impoverish communities.

2. The results on polygamy also raise a question about the causes of under-five mortality. Are children born into polygamous families more likely to die of particular infection, malnutrition, or domestic violence? The mechanisms by which larger families protect children from mortality might be quite different in each instance. Additional analysis on the composition of polygamous families (i.e., numbers of children per co-mother; number of co-mothers; relative ages of other children) might shed light on the relative importance of each of these mechanisms.

Response: Thanks, this enquiry is closely related to the first, we are not able to assign the causes of under-five mortality from this study to any particular infection though malnutrition and domestic violence are not ruled out because of the association of malnutrition to limited
resources for child care due to huge dependency as mention earlier and the prevalence of domestic violence in polygamous unions. We are not able to shed more light on the issues based on numbers of children per co-mother, number of co-mothers and relative ages of other children in the household because we do not have that data.

3. Similarly, can you shed any light on the mechanisms of death among older mothers? Is the mother’s age at birth a direct influence on child mortality, or are other factors relevant, such as competition for resources between the under-five child and other household children?

Response: It is not clear if mothers’ age at birth has a direct influence on child mortality (in fact this study does not provide avenue to examine that) however, we observed high level of illiteracy among older mothers. Further analysis revealed that 87.04% of the older mothers (age 35-49) among our study participants had not attained any form of formal education at all. This being the case, older less educated mothers may not patronize antenatal and postnatal care as compared to the younger ones who are educated. Also uneducated mothers are more likely to deliver at home and may possess little knowledge on child nutrition and care. These factors surely are detrimental to the survival of under-fives as demonstrated by other scholars (Rahman et al 2010, Adhikari et al 2010, Swenson et al 1993 and Worku et al 2009).

4. The conclusions as stated advocate for the slate of known important interventions (i.e., education, autonomy and income). Because these are already well known, the conclusions are not powerful. What this study could offer that would be powerful would be an expression of the relative impact of each of these opportunities for intervention. How important is maternal education, for example, as compared to maternal autonomy? What specific types of education are most important? How vulnerable are children born into families with many older siblings, and what is the specific influence of education on under-five mortality in these complex families?

Response: Thanks for this observation. Going through the analysis again, we observe that the impact of maternal education on under-five death far surpasses all other predictors. We observe the influence of education on age, wealth index as well as autonomy and even polygamy in our analysis. Therefore we proceed to hype the promotion of formal education and to a less extend other forms of enlightening. We see education as the major social catalyst that would lead to improvements in under-five survival as well as the status of the other identified predictors such as income and autonomy

5. Contrary to what the conclusion states, the results on polygamy seem to suggest that autonomy of at least one type – i.e., polygamy -- may not promote under-five survival. Please consider reporting a more nuanced assessment of the mechanisms of autonomy. When is the presence of
more women in the household supportive of under-five survival and when does more women adversely influence child survival? How is polygamy related to autonomy?

Response: There is some amount of inverse relation between polygamy and autonomy for females in this setting so the first point which you suggest polygamy as an aspect of autonomy is not the case in the study area. The mere presence of more women in the household those not necessarily support under-five survival (in fact our results has shown that the presence of more women in the same household who happened to be co-wives(rivals) to the mother is detrimental to under-five survival).

The presence of other women in the household may be supportive of under-five survival if they are not mother’s rivals but rather grandmothers, aunties, older siblings etc. and possess adequate reproductive health knowledge but we have not included this in our discussion since we do not have statistical evidence.

6. Please report in the conclusions on the relative importance of these factors in rural and urban areas.

Response: Actually as captured in the title, the survey was conducted in a predominantly rural setting. As high as 87.5% of our study participants are rural dwellers therefore we would not want to make any strong observations from rural and urban comparisons. However from table 2, 32.6% of urban dwellers among the respondents experienced under-five death compared to 37.92% of rural residence, from the logistic regression analysis when we controlled for other covariates, place of residence was not significant, this further buttress our decision not to make conclusions on this.

Minor concerns
1. The first sentence contains a typo: The article refers to nearing the close of 2015 instead of nearing the close of the first half of 2014.

Response: Done, the phrase “as 2015 draws to a close” has now been changed to “as the year 2015 deadline approaches”.

2. I recommend revising the first sentence to replace “unattainable” with “unattained” (the dramatic decline in under-five mortality in RLS suggests that achieving MDG4 is attainable if programs such as those you analyze are implemented).

Response: Done, “unattainable has now been changed to “unattained”

3. Also in the background section, don’t you want to indicate that this paper will
explore how established programs affect under-five mortality?

Response: No, the study only seeks to investigate the association between social, economic and other attributes of mothers and under-five mortality.

4. There are missing propositions throughout the draft. Please have a copy editor go over it for grammatical errors.

Response: Done, we have done so and all changes made by the copy editor have been highlighted in the revised manuscript.

Reviewer: Elizabeth Abu-Haydar

Reviewer's report:

Major compulsory revisions:

The authors’ state on page 3 line 58 that the major predictors of under five mortality are: the mother's education level, presence of co-wives, age and marital status.

In the conclusion on p 19 line 414 the predictors stated differ. There is also some discrepancy between the discussion of significant determinants and the conclusion for ex: autonomy in this study did not show statistically significant effects on under five mortality, yet it is listed as a key predictor. This should be clarified.

Response: The main predictors of under-five mortality identified in this study are mother's educational level, polygamy (presence of co-wives), age and marital status as stated in previous line 58 now line 56. The previous line 414 in the conclusion (now line 404) only suggests areas through which interventions could be made to mitigate under-five mortality as per the identified predictors but does not seek to state the predictors again. This has now been reframed to clarify these.

Also, the term “autonomy” used in the conclusion dose not refer directly to the variable label “financial autonomy” used in the analysis. We acknowledged in line 366 -369 of the discussion that others scholar’s measure “maternal autonomy” by considering maternal education, employment and household headship (e.g. Owais et al 2011, Adhikari et al 2010) so by referring to improving female autonomy in the conclusion, we go beyond our variable to suggest interventions that empower women and make them less dependent. Any way this part has also been reframed now.

Minor Essential revisions:

line 63- incomplete sentence
Response: Corrected. The phrase “to experience under-five death” has been added to make this line a complete sentence now (found in line 60 now).

Line 64- must read under five deaths

Response: Agreed. Has been changed accordingly

line 67- suggest specifying the attributes such as age, marital status and economic status instead of more general terms such as individual, social and economic attributes

Response: Done. The attributes have now been specified.

line 95- substitute "of" for "at"

Response: Done.

background section line 86-138 jumps around and it is sometimes confusing. Suggest moving the section from lines 105-112 and insert it at the end of line 133 to tie in the discussion around Ghana.

Response: Agreed. Previous line 105 -112 has been moved to the end of line 133 as recommended.

line 157- Specify date of GEHIP- 2010?

Response: Done. GEHIP baseline survey was conducted in 2011. It has now been specified in previous line 157 as suggested.

Line 164- change face to read faced

Response: Done.

Line 223- Edit redundant words- delete "before the survey was carried out"

Response: Done.

In table 1- under polygamous partner there is a category for no partner how is that differentiated for the analysis from not married?
Response: Thanks for this observation. Actually the “no partner” category represents none response which we mistakenly labeled as such. This has been corrected in the revised manuscript.

Line 267- Is there a reason that the p value for religion was not reported? Please add that.

Response: Done. There is no reason for which the p value for religion was not stated. This is an omission, it has now been added.

figure 2- if religious affiliation was shown to be a non-significant determinant why did the authors choose to illustrate the relation

Response: the original idea was to state that religious affiliation (especially Christian and Islamic religions) provides platforms for which individuals could be enlightened on child and reproductive health issues. Anyway I think this lack evidence so it has been removed.

Figure 1 level of education is one of the key predictors of under-five mortality but why is it the only predictor shown in a figure? Will the authors add figures for the other three predictors (age marital status and polygamous )

Response: No. having conceded the recommendations of other reviewers and discussions among ourselves, we agreed to take figure 1 and 2 off and not to present any figure, because the predictors are clearly shown in the existing tables so there is no need to show separate illustrative figures again.

line 408- change giving to given

Response: Done

Reviewer: Brett Nelson
Reviewer's report:
I congratulate the authors on their important efforts in understanding socioeconomic factors related to U5MR in northern Ghana. An important step in addressing U5MR is understanding its root causes.
In this study, the authors analyze baseline survey data among 3,975 women who had ever given birth. With chi-square analysis and bivariate and multivariate regression, the authors identify factors associated with under-five child death among these women.
Significant, robust work has been previously accomplished on this topic of socioeconomic factors related to U5MR, as outlined in the authors’ Background. Nevertheless, there are still uncertainties among the studies, and the authors’ findings do contribute to our understanding, particularly among rural communities in west Africa.

Major Compulsory Revisions
1. I agree that this is an important and interesting study. However, as you correctly state in your Background (e.g., Lines 118-126), significant work has been done on this topic. If possible, clarify further in your Background how your study differs, or if not different, how important it is to add to this established literature (e.g., still uncertainties or disagreements in the literature, important to confirm others’ findings, your study population or approach is unique, etc.).

Response: Done. The first issue is that there is scanty information on the influence of social, economic and demographic factors on under-five mortality in Ghana. Secondly there are substantial disagreements in existing literature on the subject matter. This has now been made clearer in the background as recommended.

Minor Essential Revisions
2. Title: Standardize capitalization within the title

Response: Done

3. Abstract: The authors use both present- and past-tense verbs in the abstract methods. For example, “We use baseline survey data…” and “…we ran a logistic regression…” Please standardize verb tense (e.g., past tense).

Response: Done. Also final draft has now been edited by a copy Editor.

4. Abstract, Results section: Change “…age of woman…” to “…age of the woman…” or perhaps even better to “…age of the mother…”

Response: Done. “age of the woman” changed to “age of the mother”.

5. Abstract, Results section: Add “at the time of delivery” after “35 and 49”

Response: Done.

6. Abstract, Results section: Consider adding p-value after the provided odds ratio.

Response: Done.
7. Abstract, Conclusion section: The word “so” is rather colloquial. Change to “therefore”

Response: Done.

8. Line 89: The updated U5MR figure is now 6.6 million, not 6.9. Please update and change reference to latest UNICEF, WHO, World Bank report which provides this number.

Response: Done. Many thanks for this updates

9. Line 94: Change the subject of this sentence to “Children in sub-Saharan Africa” (and re-write sentence accordingly) rather than stating that “sub-Saharan Africa has the highest risk of death in the first month of life.” Also in this sentence, reword “as at”.

Response: Done.

10. Line 101: Capitalize “Millennium Development Goal”

Response: Done

11. Line 113: Change “other” to “order”

Response: Done.

12. Line 113: Consider rewording “accelerate the rate of under-five mortality decline” to “accelerate the decline in under-five mortality rate”

Response: Done.

13. Lines 122-123: Place period after “…27]…” and start new sentence.

Response: Done.

14. Throughout the paper: Replace the several occurrences of “whiles” with “while”

Response: Done.

15. Line 125: Capitalize “Demographic and Health Survey”. Add “the” before
“richest”

Response: Done.

16. Line 126: Add “the” before “poorest”

Response: Done.

17. Line 127: Change “has” to “have” (plural subject = “factors”)

Response: Done.

18. Throughout the paper: The authors regularly mis-use the semi-colon (;) (e.g., Line 128, etc., etc.), intending it, I believe, to be a colon (:) before a list. Please correct. In fact, in many instances, even a colon before a list of items is not necessarily. A semi-colon should only be used between two related (clarifying) but independently complete sentences: e.g., “The car was a bright yellow; it was the color of the sun.”

Response: Done. Thanks for the lecture

19. Lines 128-131: Please re-word or divide this very wordy sentence – in fact, I think it’s an incomplete clause.

Response: Done. This sentence has been reframed and divided into two with some parts chopped off.

20. Line 146: Move reference 11 earlier in this paragraph (assuming this is the reference for the numbers provided earlier in this paragraph – otherwise, provide another reference for those numbers).

Response: Done.

21. Line 152: Change “rain feed agriculture” to “rain-fed agriculture”

Response: Done.

22. Line 156: Change to “baseline”

Response: Done.
23. Line 164: Change “is” to “has” and change “face” to “faced”

Response: Done.

24. Lines 160-168: Provide a little more information on when (years) and by whom (GHS? Partners?) the GEHIP is being conducted.

Response: Done.

25. Line 166: Change to “programS”

Response: Done.

26. Line 171: Again, when was the survey?

Response: Done.

27. Line 176: Decapitalize “The”

Response: Done.

28. Line 177: Change to “…useD, WITH all women…”

Response: Done.

29. Line 183: Add apostrophe to mothers

Response: Done.

30. Line 186: I don’t understand “recorded” in this context. Could you re-word this sentence?

Response: Done. We actually meant to explain that some variables had their sub-categories re-categorized (merged) e.g. Single, divorce and widows were merged and labeled “not married”. We think this sentence is out of context hence it has been removed in the revised manuscript.

31. Line 191: Change to “experienceD”

Response: Done.
32. Several places in the paper: change “in to” to “into”

Response: Done.

33. Line 192: Add “categories” after “three”; end sentence after “35-49)” and start new sentence; and add apostrophe to “mother”

Response: Done.

34. Line 196: Change to “categorIZED”

Response: Done.

35. Line 199: End sentence after “self-employed” and start new sentence

Response: Done.

36. Line 202: Correct the spelling of “recoRded”

Response: Done.

37. Line 203: Change “took” to “made”

Response: Done.

38. Line 223: Remove “before the survey was carried out” (redundant with beginning of the phone)

Response: Done.

39. Line 224: End sentence after “survey” and start new sentence

Response: Done.

40. Line 230: Change to “experienceD”

Response: Done.

41. Lines 230-231: Change to “years”
42. Several places: Change “divorce” to “divorced”

Response: Done.

43. Line 235: Change “were reside at” to “reside in”

Response: Done.

44. Line 240: Remove “observed to be”

Response: Done.

45. Line 241: Change “take” to “make”

Response: Done.

46. Line 245: Why weren’t others covered under the national health insurance plan? What other coverage did they have?

Response: although every Ghanaian contributes to the national health insurance scheme through a 2.5% of VAT charged on all goods in addition to some percentage of pension contributions from all workers in the formal sector, Ghana has challenges in getting full enrolment due to the following reasons;

1. Registration unto the scheme comes with a registration fee which most people especially the poor cannot afford.
2. To remain covered, one has to renew his/her membership every year which comes with a fee called “renewal fees”. Many people cannot effort to renew their membership every year. The figure 58.8% stated in this paper represents the proportion of the surveyed mothers who are registered on the scheme but not necessarily financially protected (active members).
3. Another reason for low patronage is that, some sections of the population are skeptical of its operations.

47. Line 250: Change to “detailED”

Response: Done.
48. Several places: The authors regularly cite in the paper and in the tables the p-value as “p=0.00.” Technically, the p-value should not be zero. Therefore, please change these to “p<0.001”

Response: Done.

49. Several places: If included with the p-values (although I don’t think it’s necessary), the “at 95% CI” should be WITHIN the parentheses with the p-value

Response: Done.

50. Line 268: Change “Traditional” to “traditional”

Response: Done.

51. Lines 272-273: Remove the editorializing comment of “rather interesting”; this interpretational statement would be okay in the Discussion but is not usually included in the Results.

Response: Done.

52. Line 276: Add apostrophe to “respondents”

Response: Done.

53. Line 294: Change to “attainED”

Response: Done.

54. Line 298: Use numbers (don’t write out) for numbers >10, such as 11

Response: Done.

55. Line 301: Correct the spelling of “divorced”

Response: Done.

56. Multiple places: correct the spelling of “enrollment”
Response: Done.

57. Line 304: Change to “enrollment IN”; change to “…contraceptive use ALSO did not confer…”

Response: Done.

58. Line 305: Change to “odds OF”

Response: Done.

59. Line 322: Remove “discussed below”

Response: Done.

60. Line 323: Change to “bivariate” (not capitalized)

Response: Done.

61. Line 331: End sentence after “age)” and start no sentence

Response: Done.

62. Line 334: Change spelling to “enhanceD”

Response: Done.

63. Lines 336-340: Include for the readers the relevant odds ratios again in parentheses so as to quantify effect

Response: Done.

64. Line 343: To which women is the study in Ethiopia referring? All women? Or those less educated. Please briefly include more details in this sentence.

Response: Done. The Ethiopian study (Warren et al, 2010) did not explicitly state which women. It states that, “Women do not seek care due to poverty, distance and limited understanding of the benefits”. Tough one can Infer from this that less educated women would most likely to have limited understanding of the benefits of seeking care.
Discussion: I would not recommend including new figures in the Discussion. Figures (and tables) are usually introduced in the Results section. In fact, I would delete these two figures altogether since their data can be effectively introduced in the existing tables.

Response: Agreed. No figure is included in the discussion, we were making reference to a figure in the results section but this has been removed. We have also removed figure 1 and 2 altogether as you recommended. We agree with you that the data is clearly shown in the already existing tables.

66. Line 345: Add period to end of sentence
Response: Done.

67. Line 349: Reword “makes sense to feel” – this is too colloquial
Response: Done. This has been reframed.

68. Lines 361-363: The first sentence of this paragraph is an incomplete sentence. Remove period at end of sentence and replace it with a comma.
Response: Done.

69. Line 365: Change to “changeD” and “experienceD”
Response: Done.

70. Line 370: Change to “….and 26], this study…”
Response: Done.

71. Line 371: Change to “seem to convincingly show the result of this…”
Response: Done.

72. Line 373: Reword “results is sparingly”(?)
Response: Done. The entire sentence has been reframed with “sparingly” taken off.
73. Line 374: Remove “probably”

Response: Done.

74. Line 376: Change “base” to “basis”

Response: Done.

75. Line 377: Remove “fairly”

Response: Done.

76. Line 379: Replace “gray area” – too colloquial

Response: Done.

77. Line 381: Change “These may” to “This may”

Response: Done.

78. Line 382: Change to “husbandS”

Response: Done.

79. Line 384: Remove “as shown in our results” otherwise this sentence is a circular argument

Response: Done. This phrase has been removed

80. Lines 389-390: Reword this sentence for improved clarity

Response: Done.

81. Line 391: Change to “previousLY”

Response: Done.

82. Line 394: Change to “and affording the mother adequate time to care for her newborn and regaining strength…..”
83. Line 400: End sentence after “[13]” and start a new sentence

Response: Done.

84. Lines 40-405: Incredibly long and wordy sentence. Please re-word.

Response: Done.

85. Line 406: Change to “settingS”

Response: Done.

86. Line 407: Start new sentence at “Therefore”

Response: Done.

87. Line 413: Remove “at”

Response: Done.

88. References: Many of the references are not correctly standardized. Please refer to Author Guidelines for details.

Response: Done.

89. Table 1: Under contraceptive use, change “None response” to “No response”. And why is this the only section where “No response” is documented? Certainly other sections had non-responses? If so, let’s present the data consistently in each section of the table.

Response: Many thanks for this observation. This is not the only section where no responses were documented. We have now indicated “no responses” for occupation, religion and polygamy in table 1. These are the other variables for which no responses were also recorded.

90. Table 1: In each section of the table, where appropriate, list the items from most prevalent to least prevalent (e.g., religion, place of residence, district), and use the same descending order in Table 2.
Response: Done

91. Table 2, headings: Use consistent capitalization for “YES” and “No”

Response: Done.

92. Table 2: As per above, do not list p-value as zero

Response: corrected.

93. Tables 2 and 3: Do not use unfamiliar abbreviations such as “JHS” and “SEC” and “(res)” unless defined somewhere – in which case, be consistent across all tables.

Response: Corrected.

94. Table 3, heading: Remove brackets around “95% CI”

Response: Done.

95. Figures: As discussed above, consider deleting Figures 1 and 2.

Response: Done. Figures 1 and 2 have been removed from manuscript.

Many thanks for a thorough review.

Regards

Edmund W. Kanmiki