Author’s response to reviews

Title: Risk factors and a predictive model for under-five mortality in Nigeria: evidence from Demographic and Health Survey, 2008

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Author’s response to reviews: see over
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The Editorial Team:

Re: Risk factors and a predictive model for under-five mortality in Nigeria: evidence from Nigeria Demographic and Health Survey

We are pleased to submit a revised manuscript referenced above according to the reviewers’ comments. We have made every effort to revise our manuscript based on the reviewers’ suggestions and recommendations, which we believe made our paper stronger and better.

In the following pages we have provided a point-by-point response to comments of the reviewers. We have put the comments in bold and inside quotation marks, with corresponding response below each comment.

We would like to thank you in advance for your consideration.

Yours faithfully,

Gbenga Kayode

RESPONSE TO REVIEWERS’ COMMENTS

Reviewer: Daniela Elleri

The above named reviewer made some comments in his/her report which we have provided point-by-point answer for them.

➢ The reviewer said “The title is misleading. Data (e.g. on children mortality) are from the DHS 2008 but the study analyses interviews performed over a five-month period to a smaller part of the population”

- we have been able to modified the title also we have given better information on how the data were collected. In addition, we have provided reference where detail information about the data collection has been published.
2\textsuperscript{nd} comment “\textit{Clear information about the study sample is missing in some part of the paper (e.g. in the background). It should be clearly stated where the data is coming from, which dataset was analysed and also the time frame which was considered.”} 

- we have addressed this area adequately we have provide a clearer information about the sampling technique applied. Also we have provided the reference where you can retrieve detail information about the data collection.

3\textsuperscript{rd} comment “\textit{It would be good to include an additional table with characteristics of the study population (how many men and women were interviewed, level of education...)}”

- we have provided a table that showed the characteristics of the study.

4\textsuperscript{th} comment “\textit{Details on how the interviews were performed (and by whom) are missing. Were any validated questionnaires employed?”} 

- we have provided additional information about the questionnaires that were used for the data collection; we also indicated where further information could be accessed.

Following minor essential revisions have been made:

- “Background session: last paragraph, second line: misspelling “competition” instead of “completion””
- thanks, we have corrected it

- “Background session: last paragraph, line 5 “there are few from good studies Nigeria” to be substituted by “there are few good studies from Nigeria””
- thanks, we have made the correction

- “Method session: reference of 2008 National Demographic and Health Survey should be included (first paragraph line 14)”
- we have provided the reference for 2008 Nigeria Demographic and Health Survey

- “Methods session, explanatory variables: “based on previous studies”. A reference is needed”
- thanks, we have also provided the references that we considered for the selection of our explanatory factors

- “Result session, first paragraph, second line: time frame is confusing: time between 2003 and 2008 is indicated?”
- thanks, we have explained that this data was collected over 5 months but they asked question retrospectively that covered from 2003 – 2008 approximately. We also made
effort to give a better picture of how the data were collected. In addition, we provided reference where further information about the data could be accessed.

**Reviewer:** Deepak Chawla

The above named reviewer made some comments in his/her report which we have provided point-by-point answer for them.

- **1st comment** “Abstract contains insufficient information about method of the research. Study setting, study design, selection of study subjects and outcome variables should be briefly and clearly described”
  – thanks, we have added additional information to the method section as demanded.
- **2nd comment** “Results and conclusions drawn in the abstract need to be changed in view of the comments on main article”
  – we have modified the conclusion and improved the result section.
- **3rd comment** “Background section needs extensive revision. Instead of discussing individual variables like maternal age, education, birth interval, family size etc. authors should briefly summarize what is known and what needs to be investigated on the topic of research. This should be followed by a statement on what knowledge gap this study wants to address.”
  – thanks we have tried as much as possible to modify the background section. Limitations of previous studied within and outside Nigeria were highlighted. Also the gaps in previous studies which this study will address were indicated and other reasons to justified why we will believe that it is essential to conduct this research were clearly state.
- **4th comment** “Risk factors of under-five mortality can be remote or immediate. For example socio-economic status, educational status, birth order and interval are remote factors which may increase the risk of a child getting sick. However, these remote factors alone will not determine the probability of a sick child dying.
Later may be associated with factors like illness severity, cause of sickness, transport or medical facilities available. Therefore, a statistical model using mainly remote risk factors is inherently not robust enough to predict the risk of child death. Although authors state that “Area under the ROC curve was greater than 90% which means that the predictive power of the model was perfect”, I doubt the validity of this conclusion (see comments on statistical analysis below).”
- thanks, we believe our model yielded a perfect predictive power. We considered many variables during the modelling process and we clearly showed that there was no multicollinearity. We believe some variables we considered would have explained the variables that the reviewer mentioned such as severity of the illness, cause of the illness and transportation. For example asset-based approached was used to estimate wealth index and this included possession of bicycle, motorcycle and motor car. Thus, this factor would have explained transportation factor that the reviewer mentioned. We believe other factors that we considered were enough to give us this perfect outcome.

5th comment “In results section authors state “Out of all the 28,647 children delivered by 28,647 mothers…” Were there no multiple births in such a large cohort? In addition, as I understand the study included interview about reproductive outcome of last 5 years. This should translate into higher number of children then mothers.”
- they interviewed 28,647 women of age 15 – 49; it important to know the some of them have stopped to having pregnancy also some were yet to marry.

6th comment “Results of the study should be presently more eloquently. At present authors are stating results about each outcome. The same information is also presented in tables. Authors are advised to use brevity.”
- thanks, we have been able to review the result and made it as eloquent as much as possible.

7th comment “Multivariate statistical analysis does not seem to be appropriate. One expects to have a summary result with the important risk factors being part of the final model. At present it seems that authors present risk estimates for each variable while controlling for all the other variables. This approach is inconsistent with what is stated in the method section. In addition, many continuous variables have been analyzed as ordinal variables (e.g. maternal age). This may cause loss of valuable information. Is this done consciously? On what
basis boundaries of these classifications have been selected is not clear. For example how care seeking behaviour was defined and classified?”
- thanks, we believe that the multivariate logistic regression analyses that we applied in this research is appropriate for it. This is in order with other previous studies. We clear stated the variables that were statistically significant in the univariate analysis will be incorporated into the multivariate model. We believe using maternal factor as a categorical variable is in order with previous studies also It will make the interpretation meaningful. We have also added that health seeking behavior was generated by combining 5 variables (having health care card, attended antenatal care, delivered at health facility, knowledge of oral rehydration solution and received antitetanus) with the aid of Principal Component Analysis (PCA)

- 8th comment “Under-5 mortality is a heterogenous entity with neonatal deaths constituting a distinct part with important role played by perinatal care.”
- thanks a lot, as far as we know outcome can either be composite / non-composite, intermediate / end point and subjective / objective. Under-5 mortality is a non-composite outcome; it is an objective and is an end point outcome, thus we believe is a good outcome to measure. It is well known that many prior studies have also used this outcome.

Following minor essential revisions have been made:

- Background section, paragraph 2, line 1 needs grammatical error correction.
  – thanks, this has been corrected
- In methods section paragraph 1 authors state “The national GDP was 38.8% when the survey was carried out”.
  – thanks, recent estimate by World Bank has been provided
- Page 6 (as per manuscript file, page numbering has not been done by authors) paragraph 2 last line needs grammatical error correction.
  – thanks, this has been amended.
- Please consider removing table 1 as this does not provide any unique information.
  – thanks, we have removed this table and it has been replaced by the table that showed that characteristics of the study population.