Author’s response to reviews

Title: Age at first marriage, age at first sex, family size preferences, contraception and change in fertility among women in Uganda: Analysis of the 2006-2016 Period

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Version: 1 Date: 26 Nov 2019

Author’s response to reviews:

Reviewer 1
The authors present a factor decomposition model to identify key elements contributing to fertility among women in Uganda. While the statistics is satisfactory such as CIs don't cross zero implying factors loading are trustworthy, I don't see anything new as far as conclusions are drawn.

While it's standard to use multivariate decomposition methods, the authors present no justification for using this method over others, such as ICA.

We thank the reviewer for this observation. This has been addressed by adding justification of why the decomposition method was selected over other methods. We recognize that Independent component analysis (ICA) method is a good for data reduction and blind source separation as it was designed for that purpose. This is an unsupervised method that does not involve a dependent variable. It summarizes the relations between all predictors, or independent variables. ICA does not require an outcome variable and yet this study was predicting the changes in fertility which requires that an approach which requires specification of an outcome variable is used. In addition, we appreciate that ICA reduces the data into independent components and these can then be run in a model to predict a dependent variable but this does not mean that a model that uses those extracted components to predict a dependent variable will necessarily provide good predictions. The purpose of our study was to examine the changes in fertility based on the known determinants that contribute to the outcome. We were interested in knowing how much of each of the specific factors contributed to the changes in the fertility.

Effects and algebra of confounding variables are not presented clearly. Allocation of variation under the model needs to derived as well. Did the authors assume independence of the factors by design? If so, why? Does lifestyle impact fertility? IS it correlated to age at first marriage? The analytical component of statistical exercise is almost absent.

Action: We thank the reviewer for this observation. We have addressed this by adding the analytical component of the analysis. Under the methods section and a text description has been added. New tables showing other results have been added as appendices 5 and 6 to show the statistical analyses.
Please explain and recompute the statistics necessary to justify your conclusions.
Action: We thank the reviewer for this insightful observation. We have redone the decomposition model by excluding the place of residence and education level from the model and the findings show that all the three variables were insignificantly associated with the change in fertility linked to the characteristics component however age at first sex was the only significant variable on the effects component.
Reviewer 2
This is a worthy and relevant paper that fits nicely with BMC Women's Health remit. There are a few minor language clarity issues that need addressing before publication - these include
1) lines 31-32 - sentence does not make sense, I think there may be a word missing after 'unmarried'
Action:
Thank you for this key observation. We have revised the sentence by adding the missing word as advised.
2) line 112 - term CEB needs defining - what does 'children ever born' actually incorporate? Still Borns for example?
Action:
We are grateful to the reviewer for this observation. CEB has been defined and clarity has been given to the effect that still born are excluded and that is a measure of cumulative fertility that includes the total number of live births that the woman had ever given birth at the time of the survey.
3) line 343 - echos rather than 'reechoes' would read better
Action:
We appreciate the reviewer for this critical observation. This has been corrected. We now used “echos”
Looking at this over a decade is really useful and perhaps a little inclusion as to why this is relevant might add some contextual information that is relevant and interesting related to the justification of this work.
Action:
This has been addressed by including at the contextual situation between 2006-2016 that may be associated with the changes in fertility and some of the factors that contributed to change in fertility during the period.

Reviewer 3
We thank the reviewer for the comments and suggestions
• The suggested addition on the conclusions has been added
• A description of the “no education” category has been added
• The coding of contraceptive use has been changed from “not using” and “using” to “no” and “yes” respectively.
• A description of the “non-numeric” response and family size preferences has been given in the methods section
• The reason for categorization of age at first sexual intercourse has been added.
• The p values of (p=0.000) have been changed to p<0.001
• We have also added that during the 10 year period, there might have been some changes in awareness and cultural changes that can be associated with the observed increase in the use of contraceptives

Do you think this percentage is enough for interpret fertility changes?
Action: We thank the reviewer for this observation. The 22% is a percentage of the change in fertility that is associated with the overall difference in educational attainment.
There is possibility of some political and social changes attributed for these changes which should be acknowledged by the authors.
Action: We appreciate this insightful comment from the reviewer. Indeed, we note that between 2006 and 2016, there were some social changes such as the introduction of universal secondary education and the revision of the national population policy all of which may have made contributions to the observed change in fertility. This recognition has been made.