Dear Editor,

This letter is in reference to your email dated July 31, 2018 with reviewer’s comments. Thank you for these insightful and helpful comments and for giving us the chance to revise our manuscript. We believe the revised manuscript has been significantly improved and the reviewers’ comments have been addressed adequately.

Please find for your kind consideration the followings:
• A section-by-section response to the comments and suggestions of the reviewers (below).
• A new revised version of the manuscript with altered text underlined.

We hope that these changes meet with your favourable consideration. Please do not hesitate to get in touch if you require any further information.

Sanni Yaya, PhD
Corresponding author.

Response to comments

Reviewer#1

The paper provides an analysis on correlates of metabolic risk factors of NCDs in 33 African countries. The findings of the article help in comparing prevalence of metabolic risk factors for NCDs and providing insight into correlates of these metabolic risk factors for future policy planning. Some revisions are required and details on the analysis will help clarify findings before any generalizations are made.

Major revisions

Methods: Dimensional analysis only appears in the abstract and is not explained in the rest of the manuscript. Furthermore, dimensional analysis doesn’t seem to be a method used for the analysis. Rather regular regression is used.
Response: The relationship between variables was examined using regression methods and the results in the abstract are presented also in the rest of the manuscript. We have therefore corrected the use of “dimensional analysis” and hope this would be accepted.

The results on prevalence of hypertension do not seem to be available for all countries of Sub-Saharan Africa. This should be highlighted in the text.

Response: We have now reported the unavailability of hypertension data in several countries of sub-Saharan Africa and highlighted same as limitation of findings generalization. This statement has been added to the first paragraph of the results section: “Notably, only 5 countries in sub-Saharan Africa region reported data on blood pressure, which include; Benin, Burundi, Ghana, Kenya and Lesotho”.

Since the prevalence of hypertension is only reported for 5 countries in table 1, it is better to make it clear in the text to which countries do the correlates of hypertension apply, a different case than anemia and BMI, in which data for most of the countries is available.

Response: We appreciate this very important note. We have now clarified in the second paragraph of results section, the reference countries for hypertension correlates: “The blood pressure regression model results applies only to 5 countries in sub-Saharan Africa region which include; Benin, Burundi, Ghana, Kenya and Lesotho where the data was captured”.

The abstract provides a general statement considering smoking, fruits, vegetables, and alcohol consumption as correlates for hypertension, anemia and BMI. However, in the findings these risk factors do not apply equally for all the disorders. For example, smoking doesn’t show as an independent risk factor for anemia, and the same for vegetable consumption.

Response: We have revised the statement to infer that smoking and alcohol consumption were not significantly associated with anemia. This is now reported in the results section of the abstract: “Body mass index was significantly associated with hypertension and anemia. The
behavioural or modifiable factors of hypertension and body mass index were; smoking, fruits, vegetables and alcohol consumption. While the non-modifiable significant factors include; age, residence, religion, education, wealth index, marital status, employment and number of children ever born. However, anemia shared similar factors except that smoking and vegetable consumption were not statistically significant. In addition, involvement in exercise was associated with anemia and hypertension”.

Minor revisions

Methods: if wealth scores were done using principal component analysis by the authors in this study, then the results of the scores should be reported. If they were already part of the DHS survey results, then that should be made clear as well.

Response: We have now reported in the independent variables sub-title of the methods section that DHS computed the wealth scores variable: “The computation of wealth scores variable was conducted by DHS and has previously been reported”.

Methods: The categorization of risk factors into distal and proximal risk factors only appears in the abstract. Since more common categorizations of risk factors include behavioral or modifiable (appears later in the conclusion as well) and non-modifiable, it is recommended to use such categories or to introduce the categorization of proximal/distal in the text.

Response: We have now reconciled the categorization of risk factors in the abstract and text alike.

Results: Consider adding exercise as a proximal factor to risk factors for hypertension and anemia. Exercise as well doesn’t show as a risk factor for underweight, overweight, and obesity
Response: Exercise has been noted as a proximal (behavioural or modifiable) risk factor for hypertension and anemia in the abstract and main text. Exercise has also been identified as not statistically significant in the multinomial logistic regression model for body mass index.

Please refer to the attached manuscript version for edits and general revisions.

Response: Thank you very much for your insightful comments. We have adequately revised the manuscript.

Reviewer#2

This is an important topic, especially the focus on women, given the dearth of risk factor data that focuses on the reproductive period for women.

The paper as currently written is poorly organized and critical sections are either murky or not adequately fleshed out for the reader. I realize that the documentation for DHS surveys are available but the authors should bear in mind that not all readers who will benefit from this information will be readily able to access the information. Additional, brief descriptions of pertinent information will strengthen the connections between the analytic choices, the results, and the appropriate interpretation of the data.

Response: We appreciate your suggestion, and have now included description of important information to enhance understanding of analytic choices and results description.

Some specific comments are listed below and I hope the authors are willing to invest some additional effort to make this paper excellent.

Response: Thank you for the comments. We are have sufficiently revised the manuscript in line with your insightful review.
Measurement of outcome variable

The second sentences notes that anemia was stratified "while adjusting for pregnancy" - this is confusing. Was this adjustment by never vs. ever parity, by number of pregnancies, or something else? It is also unclear why categorizing a continuous variable requires adjustment by a second variable as part of the definition of an outcome.

Response: DHS grouped non-pregnant “anemic” women at: Hb level < 12.0 g/dl and non-pregnant “not anemic” women at: Hb level ≥12.0 g/dl. To adjust for anemia during pregnancy, women who were pregnant at the time of the surveys were categorized as “anemic” at: Hb level < 11.0 g/dl and “not anemic” at: Hb level ≥11.0 g/dl. This has now been rephrased for better understanding.

The references below also confirmed both categorization of anemia using same cut-off for pregnant and non-pregnant women:


It would also be useful here for the authors to cite sources leading to the choices of categorization of the BMI and hypertension variables. Presumably these were chosen to be
consistent with WHO guidelines but noting the rationale for the choice strengthens the assumptions underlying the validity of the analytic approach.

Response: References of variables categorization choice have been cited appropriately.

Independent variables

The punctuation in this section makes the text very hard to follow. With fruit and vegetable consumption, the authors should note the units used to classify the categories as low, moderate, and high.

Response: The punctuation has been revised for better understanding. In addition, we have reported the units of classification as suggested.

While the DHS survey documentation undoubtedly lists these categories, the variables as described here are uninformative. Are these categories mean grams of intake per day, or servings per day or something else?

Response: We understand the need for information on the standard measurement of fruit and vegetable consumption. Conventionally, ‘days of eating fruit/vegetable in a week’ and ‘servings of fruit on days when fruit is eaten’ are compulsory measurement. To derive the standard classification, the number of servings of fruit/vegetables will multiplied by seven (7) to obtain the number of times each (fruit/vegetables) is consumed in a week. A minimum of five servings of fruit/vegetables a day is recommended adequate. Therefore, the recommended number of fruit/vegetable servings per week is 35. Unfortunately, the number of servings each day fruit/vegetable is eaten was not captured in the study countries. For consistency, the average number of days per week a respondent consumes fruit or vegetable was used in substitute.

Statistical analyses
Generally, this section is lacking a justification for the various analytic choices: what aspects of the evidence base related to NCDs justified the various statistical choices?

Response: The analytical procedure has been referenced appropriately to show consistency with previous studies.

Some of the writing is also unclear and needs to be improved, e.g. "All explanatory variables were retained for analysis due to lack of collinearity factors that were statistically significant in the unadjusted analysis results were added in the multivariable regression models to adjust for covariates".

Response: The sentence has been revised for better understanding. We understand the importance of interdependence testing between variables and the effect of confounding factors/covariates. These were separate analyses conducted at different stages which have now been separately described.

Results

The biggest problem with this section is that none of the results listed call out the relevant tables appropriately. The reader is left to go back and forth in the text to try and determine which table specific results are calling out.

Response: The description of results from Tables has been revised and typos corrected for better understanding.

Discussion

The biggest detraction here is that paragraphs 2-4 offer the authors' theories about how the observed results may be explained but there is very little evidence cited to back up the interpretation. For example, in the 2nd paragraph the authors offer a theory that the content of
alcohol and nicotine could be making a biological contribution to risk reduction but offer no citations for the plausibility of this biological theory.

Response: We have now cited appropriate references to back up authors’ premise:


