Author's response to reviews

Title: Impact of socioeconomic status and medical conditions on health and healthcare utilization among ageing Ghanaians

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

I wish to resubmit our manuscript titled 'Impact of socioeconomic status and medical conditions on health and healthcare utilization among ageing Ghanaians'. We are grateful to the Referees for providing valuable comments which have greatly improved the manuscript. We have highlighted all revisions and corrections in orange in the revised manuscript, and have provided detailed point by point responses to all the comments in this letter.

Thank you for the continued support.

Dr Bashiru I I Saeed (Corresponding author)

RESPONSES TO COMMENTS

REVIEWER 1

English Language

Comments 1-4: Although the paper is well written some language editing is needed. Editing may refer to: 1. typo errors (see for instance page 3, line 2; page 6, lines 23-24) 2. statistical terms (for instance: "response" variable instead of "respondent variable", page 2, line 6; page 7, lines 20-21) 3. terms of demographic characteristics (for instance "aged" men and women instead of "ageing" Ghanaians or men/women (page 2, lines 13 and 16, and elsewhere). 4. rephrasing some paragraphs (see for instance page 15, lines 13-18)

Answer: We have made the language editing recommended by the reviewer and highlighted the changes in orange in the respective pages and all of the revised manuscript.

Data

Comment 1: Reviewer was not clear with the number of observations used in the analysis. In page 5 (lines 11-12) the authors mention that "In this article 2142 older persons had been considered" but in page 7 (lines 5-6) as well as page 2 (lines 9-10) it is mentioned that "The pooled Wave 1 national total for individual respondents included 4770 respondents aged 50+ and 803 aged 18-49". Please clarify

Answer: We noted this discrepancy and have corrected the number in page 5 of revised manuscript to 4770, to be in conformity with the figure on pages 2 and 7.
Comment 2: Reviewer wondered if Page 6, lines 3-14: was relevant to the present analysis.

Answer: We are grateful to the referee for pointing this out to us. We agree that this section is not relevant to the analysis. We have removed entire line 3-16 on page 6.

Comment 3: I think that the section entitled "Ethical considerations (page 12, lines 18-22) should be included in the "Study design" section (page 5).

Answer: We agreed with the reviewer and have moved the Ethical considerations on page 12, and included it in the "Study design" section of the revised manuscript.

**Statistical methods**

Comment 1: Study sites (page 5, lines 14-30 and page 6, lines 1-2): too detailed geography of Ghana is no interest in the paper; instead, a good description of the sample and study design should be included

Answer: We have removed the detailed description of Ghana and agree with the reviewer that it is of no interest in the paper. We have replaced all that with a single important sentence- 'SAGE Wave 1 was conducted in all the ten regions of Ghana in 2007/2008'.

Comment 2: A detailed description of the independent as well as dependent variables used in the analysis should be included; there is none now, making the interpretation of the results very confusing and difficult.

Answer: We are grateful to the reviewer for pointing this out to us. We have included the measures of variables to help resolve the interpretation of the results.

Comment 3: The reviewer raised issues on the statistical formulation presented in pages 8-11 and page 12 (lines 1-4) and suggested some basic diagnostic tests used to assess the goodness of fit of the models.

Answer: We agreed with the reviewer and have removed the statistical formulation for the story to flow. We have also incorporated the diagnostic tests in the revised tables.

Comment 4: Additionally, the authors mention (page 2, lines 10-11; page 7, lines 18-19) that they have estimated “Ordered” and “Binary” logit models. However, I cannot see any results based on ordered logistic regressions. It seems to me that results presented in Tables 2-4 are based on binary logistic models only. Please clarify.

Answer: We appreciate it very much and have modified the results to reflect both “Ordered” and “Binary” logit models
Comment 5: The referee pointed out that it is not clear to him what the difference is between models 1 and 2 presented in Tables II (page 21) and III (page 22).
Answer: We are happy with the concern and have subsequently made amends in the revised tables.

Comment 6: The reviewer also expressed concerns on Models 1 and 2 in Tables II and III and Models 1, 2 and 3 in Table IV include “Money” (perhaps in continuous form) as well as “Income quintile” (I assume in ordinal form) as independent variables expressing economic position. Why both? Are there any multicollinearity effects? Also, what does “money” mean? Perhaps household wealth and if so, how is it measured?
Answer: We are grateful to the reviewer and duly corrected it ("social class" instead of "money"). Its measurement was explained in the “Measures of Variables” that has just been introduced.

Results

Comment: Description of the results of the models is inadequate and confusing. Also, for instance, page 13, lines 14-15: what does this sentence mean? The same applies to the phrase “On successive inclusion ... by the older persons” (lines 17-19).
Answer: Description of the results from the models in most parts of the results have been re-written to make them clearer. The two sentences on page 13, lines 14-15 and lines 17-19 have been re-written and made more clear.

Tables and References

Comment 1: In the text Tables are numbered as 1, 2, 3, 4 but Tables presented at the end of the manuscript (pages 20, 21, 22 and 23) are numbered as I, II, III, IV. Also, in the “Introduction” section references are entered in the text using superscript numbers but in the “Discussion” section references are entered by name of the authors. Please correct according to the journal’s instructions and style.
Answer: Table have been numbered serially with Arabic numerals (1-4) as it is in the text. All the references have been redone in the text and the reference section in accordance with the guidelines of the BMC Public Health.

Comment 2: The titles of the tables are not self-explanatory or they are unclear. Please correct.
Answer: Titles of all the Tables have been modified and made more clear and complete.

Comment 3: Tables 1-4 should include the number of observations used in the analysis for each variable (Table1) and each model (Tables 2-4). Also, at the bottom of Tables 2-4 please include basic measures of diagnostic tests (e.g. change in the Likelihood, Hosmer-Lemeshow test, Nagelkerke R-square or whatever you think is relevant, applicable and necessary).
Answer: The above concern by the referee has been fixed. We are grateful the referee.
Specific minor comments

Comment: Reviewer had 4 minor comments.
Answer: All the minor specific comments raised by the reviewer have been made on the specified page and highlighted in yellow in the revised manuscript.

REVIEWER 2

Comment 1 & 2: Minor Essential Revisions that I suggest are related to the mathematical equations on pages 7 through 12. They are important but disrupt the flow of the paper so I suggest the authors construct an appendix and preserve and present this information in that appendix which can be referred to in the text. Otherwise, I find the questions clear, the data presented coherently and the writing to be a high scholarly value
Answer: We agree with the reviewer and have moved the mathematical equations to the appendix.

REVIEWER 3

Comment 1: On Page 6 line 16-17, it was mentioned “SAGE is a longitudinal study with nationally representative samples of persons aged 50+ years in Ghana, with comparison samples of younger adults aged 18–49 years in Ghana”. Could you please confirm which age group have been included in the model in Tables 2-4? If both age groups 50+ and 18-49 are included, you might want to use a dummy variable in your model to identify the effect of these two age groups instead of using one variable of age. In addition, both age and age square term are generally included into the model
Answer: With the revised results, both age groups are included and thus used a dummy variable in our model to identify the effect of these two age groups. We have also included both age and age square terms into the model

Comment 2: On Page 8 line 9, “Chi-square test” was mentioned. Should it be “Likelihood Ratio Test”? Could you please report and discuss your test results at somewhere? Could you please also report F statistic test for each model like in Roy and Chaudhuri (2008)?
Answer: We agree with the reviewer that it should be LRT. We have also reported F statistic test for each model as suggested

Comment 3: It is not clear how all the formulas in the section “Statistical Methods” serve directly for your model and analysis.
Answer: Per the comments of Reviewer 3 and the other reviewers all the mathematical equations have been moved to the appendix in order not to disrupt the flow of the story.

Comment 4: The variables summarized in Table 1 are different from the variables used in the model in Table 2. Could you please summarize all the variables you have used for the model in Table 1 and give some brief explanation for all key variables?
Answer: With the revised results, variables summary in Table 1 are same with variables used in the model in Table 2
Comment 5: “Enable factors” is mentioned on Page 7 line 23 and on age 13 Line 9, and “enabling and predisposing factors” on page 12 and page 14 but there is no explanation for what do you mean enable factors and predisposing factors.
Answer: We are grateful to the reviewer and have explained predisposing and enabling factors extensively in “Measures of Variables”

Comment 6: Should the section “Ethical considerations” on page 12 go to somewhere on page 6?
Answer: We agree with the reviewer and have moved the “Ethical considerations” to the section on Study design as suggested by reviewer 2 as well.

Comment 7: On page 13 line 4 and line 17, it was mentioned that “after controlling for chronic illness”, Does “chronic illness” mean “Impairment of daily function” or “medical conditions” controlled in Tables 2-4 or others?
Answer: We appreciate the reviewer’s comment. “chronic illness” has to do with “medical conditions”

Comment 8: On page 13, it was mentioned that “In model 4, after controlling for the enabling factors, urban settings, income quintile 5 (highest income 10 group) and subjective well-being had less impact on the self-assessed health (Table 2)”, but there is no model 4 in Table 2.
Answer: We agree with the reviewer and the revised table 2 rectifies that

Comment 9: The interpretation of the model results needs to be improved, please see how other papers tell the story from the model results
Answer: Description of the results from the models in most parts of the results have been re-written to make them clearer.

Comment 10: Please clarify whether the numbers in Tables 2-4 are the estimated coefficients from the logit model, instead of odds or marginal effects.
Answer: We are grateful to the reviewer and reports that the numbers in Tables 2-4 are the estimated coefficients from the logit model

Comment 11: Please explain on what are the differences between model 1 and model 2 in Tables 2-4.
Answer: We are happy with the concern and have thus established the differences in the revised tables

Comment 12: In Table 4, is the dependent variable “hospital utilization” or “outpatient health usage”? It is not clear in the explanation
Answer: We are grateful to the reviewer. The dependent variable is “hospital utilization”

Comment 13: As income and health can affect each other, you might want to run the model
by controlling economic, social and demographic variables first, and then include medical conditions and impairment of daily functions to see how the coefficients change from one to the other.

**Answer:** We are grateful to the reviewer. We have accordingly re-run the analyses and generated the desired results.

**Comment 14:** The findings indicate that “income and social class have strong beneficial impacts on functional limitation and outpatient care” (Page 14 line 8). I can understand the positive correlation between income and health utilization, but not clear why income has positive effect on functional limitation.

**Answer:** We are very much appreciative of the reviewer’s concern. Upon the re-run of the analyses, the concern has been addressed.

**Comment 15:** On page 15 lines 18 to 21, it was mentioned “The older population in the higher socioeconomic group probably may be more aware and also may have increased health risks due to lack of exercise, being more sedentary, increased intake of high fat-laden diets and hence more need for outpatient care”. This is not understandable as in general, higher income indicates better health (less care need) but higher access to health care. Please check the variables and results of the model.

**Answer:** We are grateful to the reviewer. The revised analyses has catered for that.

**Comment 16:** Please explain dependent variable in Table 2: is it self-assessed health rated as “1” excellent to “4” poor or inversely. This will help to understand why the sign of coefficients of income in this study is different from estimates by Roy and Chaudhuri (2008).

**Answer:** We are thankful to the referee. The dependent variable in the said table is explicitly explained in the “Measures of Variables”.

**Minor Essential Comments**

**Comment 17:** As you have estimated the impact of social economic status (SES) on both subjective and objective health (self-reported health and functional limitation), you might want to change “subjective health” to “health” in the title “Impact of socioeconomic status and medical conditions on health and healthcare utilization among ageing Ghanaians.”

**Answer:** We agree with the reviewer and have modified the title accordingly.

**Comment 18:** On Page 2 in the section of “Results”: In order to match the title of the paper, you might want to summarize more on the impact of SES and medical conditions instead of the impact of ageing and gender difference on health and hospital utilization.

**Answer:** We are thankful to the referee and accordingly did the summary to reflect the “title of the paper”
**Comment 19:** On Page 4 in the third paragraph it was mentioned that “This trend is expected to increase significantly given population policy objectives of reducing child mortality and increasing life expectancy”. As the reducing child mortality will have impact on the dependent ratio but not the proportion of ageing. You might want to use “the dependence ratio is expected to increase significantly” instead of “the trend is expected to increase significantly”.

**Answer:** We agree with the reviewer and have modified the sentence accordingly on page 4 of the revised manuscript.

**Comment 20:** On Page 2 line 9 in the section “Methods”, it was mentioned that SAGE conducted during 2008-2009, while in Page 6 line 9, it was mentioned “one round of data collection took place in 2007”. Could you please check and confirm the consistence in years?

**Answer:** We noted this discrepancy and have corrected the dates as 2007/2008 on page 2 of revised manuscript.

**Comment 21:** On Page 7 line 18-19, I would like to recommend to use “Ordered logit model” and ‘Binary logit model” instead of “Ordered logits” and “Binary logits”.

**Answer:** We have made the changes recommended.

**Comment 22:** There is no reference in the list for Agresti (2007) mentioned on Page 7 and McKeal et al (2005) on page 12.

**Answer:** Per the recommendations of the reviewers these mathematical equations were removed from the main text to the appendix. The references were therefore not included as part of those in the main text.

**Comment 23:** On Page 11, it was mentioned “gp (#####aq”. Should it be “gp (#####ap”?

**Answer** It has been resolved in the revised manuscript.

**Comment 24:** On Page 14 line 13, it was mentioned that “by examining disparities in the use of health state and healthcare utilization” (on page 15). Should it be “by examining disparities in health and healthcare utilization”?

**Answer:** The suggested change has been made.