Author's response to reviews

Title: Multimorbidity prevalence and patterns across socioeconomic determinants: a cross-sectional survey

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Author's response to reviews: see over
Dear Editorial board of BMC Public Health,

Thank you for considering our manuscript for publication in your journal.

Please find enclosed the revised manuscript titled “Multimorbidity prevalence and patterns across socioeconomic determinants: a cross-sectional survey”, by Agborsangaya Calypse B, et al.

We find the reviewers’ comments very insightful and useful. We have also attached a “response to reviewers’ comment”, indicating where changes have been made, with accompanying explanations. We hope to receive a favorable response from you.

Sincerely yours,

Agborsangaya Calypse Bessem, on behalf of all authors.

**Corresponding author**: Jeffrey A. Johnson at the Department of Public Health Sciences, 2-040 Li Ka Shing Center for Health Research and Innovation, University of Alberta, Edmonton, Alberta, Canada, T6G 2E1
Response to reviewers’ comments:

Title: Multimorbidity prevalence and patterns across socioeconomic determinants: a cross-sectional survey

1. From Reviewer: Helena Britt

   We sincerely thank the reviewer for the insightful and useful comments.

Comments and responses

Minor Essential Revisions:
1. Page 11: Interpretation of Table 5. I believe this paragraph needs to be re-written. I think you have it the wrong way round. I believe it should read: (from sentence 2 onwards).
   ‘In persons aged 25-44 years those more likely to have multimorbidity were: those with an annual income less than $100,000; and those NOT living with children aged 16 years or younger. Among those aged 45-64 years, multimorbidity was significantly more likely among females; those with a household income of less than $100,000; those NOT living with children. Finally among persons aged 65 years or more, Multimorbidity was significantly more prevalent among: females; those with a household income of less than $30,000; those who did NOT live with children aged 16 years or less.’

   The point is
   a) direction of the result, and
   b) the independence of each result after adjusting for the other variables (i.e. they are not more likely to be female ANF more likely to be something else).

Response to comment:

   - Page 11, para 1, lines 2 - 8: The statements have been rephrased as suggested by the reviewer.


   I am sorry I failed to pick this up on the previous review.

   There are no denominators in this table, so when I read the result in the Results section I did
not know if (e.g.) Hypert-depression/anxiety-chronic pain –arthritis was 5.4% of the total or of an unknown number of those with four of the diseases.

Please add denominators in each subsection of the table – e.g. in the line Disease pairs, under ‘frequency’ put n= 383? (this is my calculated estimate - may not be exact)) and do the same for each subsection, so we know the denominator – then to make it clear draw a line between the subsections of the table. Please also make it clear in the Results that the denominator is (e.g.) of those with 4 etc.

Response to comment:

• Page 31, Table 2: We have inserted a line, and 5% grey shading, below each row containing the subsections (e.g. Disease pairs).
• The total n for each subsection e.g. Disease pairs (n = 384) has been included in the table (Table 2).

3. Numbering of figures and reference in body to Figure.
You have (as suggested) removed Figure 1. You need to update the reference to Figure 2 in the body of the paper– and make it Figure 1. Also update the label of current Figure 2, to Figure 1.

Response to comment:

• The label in-text and figure heading has been appropriately updated
2. **Reviewer**: Stewart Mercer

Comments and responses

**Reviewer's comment:**
I'm happy for the paper to be accepted now if the authors include the paper by Mercer and Watt 2007 in Annals of Family Medicine as suggested in my last review. The authors do not make a coherent arguments as to why it should be omitted, and given that it reports on multimorbidity and socio-economic status, it would be wrong in my view not to include it.

Response to reviewer:
- We have appropriately cited the study by Mercer SW & Watt GC, 2007 in-text (ref # 15).
3. **Reviewer:** Bruce Guthrie

**Reviewer's comments:**
Thank you for asking me to re-review this paper. The authors have responded appropriately to the major revisions I suggested, and to most of the others.

**Minor essential revisions**

1. The authors say that the population nature of their dataset is a key strength (which it is), but that needs qualifying in two ways. First, I had asked that they comment on the generalisability of the study to populations outside Alberta, but I can't see that this has been addressed. I think this mainly relates to the age structure of the Albertan population, and how this might vary across different countries. For what it's worth, ~20% of the UK population is aged 65 and over compared to 15% of their sample, which means that the finding that 70% of multimorbidity occurs in people aged 65 or less would likely be less striking in other countries (still likely to be the majority, but probably more finely balanced). I would like to see the authors comment on this issue explicitly. Second (and not mentioned by me first time round), the authors should avoid claiming that they have a general population survey or provide a general population estimate of the prevalence of multimorbidity, because they have only surveyed adults. The easiest way to address that would be to simply say 'general adult population', 'adult population survey' etc throughout.

**Response to reviewer:**
- Statements indicating that the study is based on a “general population” have been rephrased to “general adult population” (Page 2-Abstract conclusion; Page 6, line 3-Methods section; Page 9, para 2 line 2- Results section; Page 12, para 1 line 3-Discussions section)

2. I still don't understand the distinction between 'college' and 'university' education, and that these words have different meanings in different countries. I presume 'college' means 'post-High School further education but not at a university or not leading to a university degree', but the authors should ideally
add such a definition to the methods.

Response to author:
- Page 7, Para 2, lines 3 – 5: We have (as in our previous modification) detailed the difference between categories of educational level.