Reviewer’s report

Title: Association of multiple chronic conditions and pain among older Black and White adults with diabetes mellitus

Version: 0 Date: 15 May 2017

Reviewer: Staja Booker

Reviewer's report:

This study adds to knowledge base important research on the dyadic association of chronic conditions and chronic pain in older African Americans, an under-represented research population, and Caucasian Americans. In particular, your study identifies the problem of musculoskeletal conditions and pain, which is consistent with literature which shows that osteoarthritis accounts for the majority of chronic pain in older African Americans. Overall, the study is original and provides a good introduction to better understanding the relationship between MCC, pain, and SDoH. I have several minor and major concerns and suggestions.

Minor concerns:

1. Please read manuscript thoroughly to identify grammatical errors, especially within the abstract!

2. There is a need for consistency in terms. African American, non-Hispanic Black, Caucasian American, and non-Hispanic White are used throughout. Choose one term for each group and use throughout paper.

3. Page 3, line 14: Is this a CDC definition? Also, I'm not sure all chronic diseases can be characterized as "slow in progression." The progression is individualized, and when not managed well can progress quite quickly.

4. Page 6, line 9: Is "a mail" supposed to be "email" or "by mail"?

5. Page 6, line 41- Chronic health conditions- why was both renal and kidney listed? Aren't they the same thing? Keep it simple… use one or the other.

Major concerns:

1. Background:
a. You provide some general statistics on diabetes and MCC in older adults, but to make a stronger case and show difference (if any), need to provide more specific data on (1) diabetes prevalence for each population (African Americans and Caucasian Americans) and (2) average number and types of MCC common in each population.

b. Even though both groups have diabetes, it is highly likely that the general/national prevalence of MCC is different between groups. This would also have implications for the cluster analysis in that you may need to adjust and weight data between the two groups. Because if African Americans have a higher occurrence of certain MCC, then the results are already skewed.

c. Would like a sentence or two on how various MCC, aside from diabetes, are associated with chronic pain symptoms and how chronic pain can be a chronic disease itself.

2. Methods:

a. What were exclusion/inclusion criteria- Is this what you provide on pg.15 under Declarations??

b. Pain measurement- Were all participants required to have pain?

c. Pain measurement- Pg. 6, line 31- There are some instrumentation issues associated with the pain severity scale used, which was a four point scale using the following descriptors: no pain, annoying, uncomfortable, dreadful, and agonizing. While we know pain is highly subjective, this scale provides no way to compare actual severity across patients. For example, what does annoying pain mean? Pain can be simultaneously annoying and dreadful. These are not good categorical, discrete descriptors that can be easily interpreted across patients. I assume since means were presented that each descriptor was coded 0-4. In addition, there are no validity and reliability data to support this type of measurement. Are these descriptors normally used by older adults?? Without any demonstrated psychometric support, there is no way to tell if these word anchors are appropriate way to quantify/qualify/communicate pain. I'm finding it difficult to accept this statement made on pg. 9, "...were each individually associated with higher levels of pain severity..." How do you know pain severity was higher based on those seemingly arbitrary descriptor anchors?? I did see that you stated there was no pain standardized tool used, but most definitely need to address this in the methods and limitations section in greater detail. I'm tempted to ask you all to remove the analyses related to pain severity from the paper altogether because the method of measurement without psychometric support invalidates the outcomes. For any publication on pain, really need a validated, standardized tool.
d. Chronic health conditions- Pg. 6, line 41- Clarify what is meant by nurse diagnosed. Registered Nurses do not diagnose unless they are nurse practitioners.

e. Chronic health conditions- Pg. 6, lines 39-46- The authors state that the list was generated based on common chronic conditions, but there is no evidence that shows these are the most common conditions for both African American and Caucasian American older adults. Also, who developed the list? Was it the MD on the study? Need to provide supporting data, such as statistics in addition to expert opinion.

f. Demographic variables- Pg. 6, line 53- so education was coded as 1 year, 12 years, 16 years etc.?? Need clarity.

g. Pp. 6-7- Authors state five demographic variables were assessed, but in statistical analyses they analyze a sixth variable, gender. Please correct on page 6.

h. Methods and/or Results- There was no explanation of sample determination for this EFA, no results for the Kaiser-Meyer-Olkin (KMO) index or Bartlett to show that the sample met the factor analysis criteria were provided, or eigenvalues presented.

3. Results/Discussion:

a. I would ask the authors to ensure their discussion adequately addresses each significant findings before proceeding into discussion about SDoH. For example, there was no discussion about men reporting lower pain frequency.

b. Would like more discussion on each factor and how each factor is related to pain or how they contribute to pain.

i. I'm surprised that cancer loaded with heart disease. Any thoughts about this?

ii. There was a quite a bit of discussion about SDoH and chronic disease management, but please insert a quick statement on how managing chronic disease can reduce chronic pain. The (1) link between MCC and chronic pain and (2) the impact of SDoH on chronic pain are missing. While it is older study, may be good to cite Carmen Green's study showing an association between neighborhood and pain. That would help support the SDoH and pain linkage.

c. I know you needed a way to quantify each descriptor for the statistical analysis, but this method strips the subjectivity of the descriptors used. As noted above, it is hard to quantify those descriptors. What's the point of using that scale if you are going to convert those into numerical data?? Why not use the 11-point NRS scale (0-10)?
d. Pg. 11, lines 22-31- statements on population growth can be deleted. Start with "The Joint Center for Political and Economic Studies suggest that by eliminating health disparities in chronic disease management, there would be a reduced direct medical cost by $229.4 billion, and a reduced indirect-related cost, associated with the illness and premature mortality, by approximately $1 trillion."

e. Pg. 11, line 55- Clarify what national epidemic you are referring to- health disparities, diabetes, or MCC?

f. What do these results mean for older African and Caucasian Americans without diabetes mellitus? It is intuitive to know that people with diabetes are more likely to have microvascular and cardiac conditions.

g. Table 2- consider including the variance of each factor in the table too.

h. Provide a few implications for research.

4. Limitations:

a. Another limitation is that all chronic conditions were self-reported as no methods to verify health diagnoses were reported. So perhaps there is some potential for misclassification bias.

b. I wonder if you need to briefly address effect of recruitment setting because it is possible that those recruited from the community have less chronic conditions than those from diabetes clinic/those currently seeing a provider to manage diabetes (if that data are available). I'll leave the decision to you, the authors.

c. Since you talk about disparities and comparing groups, although there were few statistical differences in prevalence of each chronic condition between groups, can you speak to whether factor analysis loadings would be same/different if analyzed for each racial group rather than as one group?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Unable to assess
Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
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I am able to assess the statistics

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