Reviewer’s report

Title: Development of a context-sensitive physical activity intervention for persons living with HIV and AIDS of low socioeconomic status using the behaviour change wheel.

Version: 0 Date: 17 Aug 2018

Reviewer: Joachim Voss

Reviewer's report:

Dear Authors,

Thanks for allowing me to read your extensive work. I will raise a number of issues that made it very difficult for me to comprehend your work. I will make section by section suggestions for changes. In general, I am very confused by mentioning three unpublished studies throughout the entire manuscript. Are they not published for a reason? This makes this whole document very suspicious that you are not presenting data to justify your decision making steps. You might want to consider publishing those first, so the reader can read them to better understand your current manuscript. It is completely unclear, why you need a context-sensitive intervention in South Africa and you never describe the context of the people you want to support. The manuscript would really benefit from an editor to improve the grammar and sentence structure.

Abstract: It is unclear why gender plays a role in the description of this process. Come out and say you developed a context-specific intervention for low SES WLWH and justify it in the background. The abstract mentions a mixed-method and a cross-sectional study, but none of this plays really a role in the manuscript. They are confusing and do not describe the rather theoretical development steps of this process. I also did not see any feedback that any low SES WLWH have provided to this process. The second sentence in the result section is very unclear and needs to be rewritten.

The Behavior Change Wheel has a wide range of policy implications that have not been looked at in great detail.

Background:

L 75 Please provide some numbers for this statement.
L78 Many PLWH of low SES walk a lot, carry a lot, and based on your description they are not physically active. Many would not see this as exercise, so bringing this more into the focus of these individuals is important work.

Please insert a definition for physical activity that is based in an African context and not the American Academy for Exercise Sciences.

It is unclear what makes the Behavior Wheel appropriate to LES populations when planning an intervention.

L 90 page 5 needs a references for the two theories SCT and TTM.

L 94 I am lost what intervention you delivered in Xhosa? This paragraph is completely out of context.

L102 Define short-term in your measurable goals please.

L103, where were these exercise classes held? Again, this whole section makes not really sense because important context is missing.

Behavior Wheel Change Paragraph

L162 If the COM-B system and the TDF when combined offer indeed a complete theoretical model for understanding behavior change, when do you seek the input from the Low SES WLWH along that process?

Much of this analysis reads to me as based on the opinion of the authors after an extensive literature review. Is that correct, please convince me otherwise.

Please spell out abbreviations such as APEASE for the first time.

Materials and Process

The short summaries of the four studies does not add to a more in-depth understanding of how the authors arrived at the new framework. It is unclear where participants were really involved besides study 4, but even there I did not see that they discussed any of the theoretical dimensions of the new model.

Page 11 238 Unpublished data was used to implement the evidence from preliminary studies into the new intervention process. So no one will be able to ever repeat this study process.

Page 12 Table 3 does not show questions that were asked and who was asked?
P 12 Lines 270-278 do not address safety, distance, temperature and cultural practices. They frequently determine in impoverished communities what is acceptable behavior and what is not. Did you ask in any of the studies. This is especially true for women.

P13 Who scored that table and based on what criteria did it receive a rating of promising or unpromising?

P 16 The discussion does not address how this framework compares to similar work in Asian or South American impoverished communities, where exercise is frequently seen as time spent on idle activities.

P 16 374 I would not see this as a separate study but the accumulation of four previous studies that resulted in a combined theory of behavior change.

I find the tables too numerous and also burdensome to read, as they frequently provide little detail.

For example Table 7 restriction - no, since it was not practical.... what are these statements referring to? Or the next statement related to environmental restructuring is the same - what does this mean?

Thanks again, I find this work very important, I just think this manuscript needs significant more clarity before it really impacts the behavior of impoverished communities.

**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.

No
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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