Reviewer’s report

Title: Formative Research for the Design of a Scalable Mobile Health Program on Water, Sanitation, and Hygiene: CHoBI7 Mobile Health Program

Version: 0 Date: 05 Feb 2019

Reviewer: James Tidwell

Reviewer's report:

This paper addresses important topics, both in understanding handwashing behavior change and the use of mHealth interventions, and fills a void in the literature, namely the use of intentional, theoretically-driven methods of formative research and the reporting of those findings. There are several strengths of the manuscript, including the adaptation of a program previously demonstrated to be effective whose evaluation yielded theoretical insights into how such an mHealth intervention might work; the broad engagement of stakeholders in designing the program for large-scale uptake; and the extensive feedback solicited from end users.

There are a couple of changes which in my opinion would make the manuscript much stronger. Specifically:

1) There is a discussion of conducting theory-driven formative research, but it seems from my reading that the main use of theory was in identifying behavioral determinants from the prior program to use in the current one through the evaluation of the prior program. The other mention of theory I found was the description of drawing from multiple theoretical frameworks without discussion of how that is done (i.e., simply taking determinants from different frameworks is far from a neutral approach to theory). I think that there is a great opportunity to strengthen the conclusions if theory is referenced/used in any or all of the following ways: (1) The process by which FR was done (e.g., stakeholder engagement, iterative testing, etc., and how that impacted the design process), (2) The theory used to adapt a non-mHealth intervention to an mHealth intervention (this is not my area, but I think that this would be fascinating to consider and demonstrate for others, especially given what seems to me to be the common assumption that a non-mHealth intervention simply translated into text messages or an app is somehow an effective way to develop an mHealth intervention), or (3) The behavior change framework(s) used (either the original source theory, or amalgamation of theories, with a resulting theoretical framework)- as much as possible given that some of this may be post-data collection theoretical exploration (though re-examining interviews from a new theoretical lens may be to some extent possible), but this would also be useful in the planned RCT evaluation to better understand program effects.
2) A constant challenge with small sample, qualitative FR to directly feed into a behavioral intervention is how to elicit preferences that are meaningful and that might lead to the greatest behavioral impacts (e.g., it is unsurprising that the government officials recommended the source of the messages be a government official!). It would be helpful to provide more critical reflection on the stated preferences of individuals, perhaps couched in relevant literature (e.g., are voice vs. text messages actually more effective? how often should messages be sent?) to the degree possible.

There are a couple of other small issues I noticed (this is far from comprehensive- these are just the ones that jumped out at me):

P28, L51 "shorten"->"shortened"
P29, L4 "charge" -> "charged"

Lots of noun phrases used as adjectives that need hyphenation (e.g., "theory-driven approach")

There are also a few references that could be quickly updated- specifically, updated diarrheal disease burdens, portions attributable to handwashing, and figures on handwashing rates after contact with excreta globally.


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

Yes

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?
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:

Acceptable

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