Reviewer’s report

Title: Prevention of tick bites: an evaluation of a smartphone app

Version: 1 Date: 31 Jul 2017

Reviewer: Kevin Griffith

Reviewer's report:

Thank you for the opportunity to review "Prevention of tick bites: an evaluation of a smartphone app." I appreciate the authors’ work to revise an earlier version of this manuscript. The revised manuscript reads more logically and clearly.

The manuscript does present useful information on a new approach to education and behavior change for tick bite prevention. The authors have more clearly communicated the potential benefit of the smartphone application (i.e., immediate but not long lasting) as another tool in the effort to encourage behavior change. I do think that the findings and information would be a beneficial addition to the literature.

With that, I still struggle with some of the methods and conclusions drawn from the study.

1. Convenience sample and intended population -
   The authors acknowledge that the study is not representative of the Dutch population, and that this was their intent (i.e., to reach people who would use the app; lines 505-510). However, this seems to be a group that actually may not need much information or targeting. The results in questionnaire 1 for the non-app users are quite high for all categories (i.e., self efficacy, response efficacy, and intention are all above 85% for the positive category) except for knowledge.

   With this convenience sample, it appears the population is engaged and motivated to start, and I'm not sure that the application really provides much additional benefit. Yes, one might argue that there is a statistical difference. Nevertheless, a difference, to be a difference, must make a difference.

   I would be cautious to generalize these findings outside of a very motivated population, which may not be the best target group when considering limited public health dollars. In thinking about populations, one might consider the always/near always users (motivated), the sometimes users, and the never users (recalcitrant). From a public health perspective, the largest group and the one from which we can effect the most change/benefit tends to be the middle group.
2. Missing baseline evaluation –

I understand the authors' explanation behind not doing a baseline evaluation though I think it would help clarify if/how much the application improved knowledge in questionnaire 1. The non-app user results may act as proxy, but I would rather see the progression.

3. Analysis –

Following on a piece of #1 above, the authors dichotomized the scale range for each of the categories, which is a reasonable approach. Nevertheless, given the high scores throughout for positive (which typically was a 5-7 on the scale), did the authors consider or analyze the data with additional strata (e.g., 3 or 4 categories)? I wonder if this might help separate out the data. It may not given the high scores reported for the dichotomous categorization but it is something to consider.

3. Discussion of effects of the application –

As mentioned above, this is a highly engaged population, and I wasn't convinced of much difference between the two groups with questionnaire 1 or much change in either group between questionnaire 1 and 2, even considering the statistical significance. Even if you believe that there was improvement in response efficacy between questionnaire 1 and 2, the benefit of the app is called into question given the equitable increase among non-app users (noted by the authors in lines 479-484).

The key point from the analysis is that even with an engaged and motivated group, the application did demonstrate higher levels of knowledge (using dichotomous categories) as compared to the non-app using group when actively using the app. The knowledge was not sustained, but that is okay given the intended purpose of the application.

4. For future research, I agree with the authors that this study doesn't equate knowledge or intent with actual behavior, and that should be studied. The authors note this in lines 528-529, but state that this couldn't be done because of a delay in follow up/introduction of recall bias. I disagree, and think that a study could be done to evaluate the effect of the application on prevention behaviors (e.g., cohort study), and that would be useful if the application is being promoted as an intervention. As it is now, the authors have provided more "process" indicators rather than "outcome" indicators.
Another useful study would be to see how to access the at risk population who were not part of this recruitment population to evaluate their impressions and use of the app and survey knowledge, efficacy and intent. I would think this to be a much larger group, and one that could most benefit from the application.

In summary, this article demonstrates that the application is relatively frequently downloaded and well received among its users. Among this engaged and motivated population, the application did improve baseline knowledge when using the application, though that knowledge gain was not sustained. Self-efficacy, response efficacy and intention remained high for both populations. The application may be of benefit for behavior change efforts. Future research should focus on use and acceptance among less engaged and less motivated populations and if use of the application leads to actual behavior change and disease reduction.

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.

Yes

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

No

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I am able to assess the statistics

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