Reviewer’s report

Title: Mobile Health in the Management of Type 1 Diabetes

Version: 1 Date: 22 Aug 2018

Reviewer: Rachel Miller

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The objective of this study was to perform a systematic review and meta-analysis of mobile health interventions on glycemic control in type 1 diabetes. The authors report that among 8 studies representing 602 participants, there was a significantly greater decrease in mean HbA1c associated with mHealth intervention compared to standard care. This study addresses an important topic and its major strength is that it provides a nice systematic review of mHealth interventions in type 1 diabetes. However, there are several issues that need to be addressed:

Major comments:

1. In the abstract and throughout the text, the authors refer to "glycemic index" to mean "glycemic control". This is incorrect terminology and should be changed throughout.

2. In the exclusion criteria, it says that studies were excluded if they included patients with diabetic complications. This does not seem to be true, as for example the study by Rossi et al. includes patients with retinopathy and neuropathy, as shown in their Table 1. So does this mean that studies including patients with minor complications were included? More detail is needed to clarify this point. Which specific complications were considered exclusion criteria and how many studies were excluded for this reason should be described. Excluding participants with complications also affects the generalizability of these results.

3. In the statistical analysis section, it seems that the authors started with the fixed effects model and then performed a test for heterogeneity. Because this test was not statistically significant, they determined that the random effects model should not be used. While this is a commonly used approach, it is better to begin with the random effects model especially because we would assume that there is likely variability across these studies which were carried out in very different populations. As one of the goals of meta-analysis is to determine variability of effect sizes across studies, the random effects model is likely to be more appropriate regardless of the result of the test of heterogeneity. If the fixed effects model is used when the random effects model should have been used, this can result in invalid estimates of the means, standard errors, and significance tests. More detail regarding the modeling would help to clarify the approach and justify the use of the fixed effects model. Were random effects models also fit? Did the estimates change when using random effects versus fixed effects?
4. The p-values are currently presented as >0.05 or <0.05. Exact p-values should be presented.

5. There are a few sections of the discussion that contain statements that are not substantiated by references. For example, on page 14 it is stated that "compared with adults, teenagers have a poor understanding of the use and content of mobile phones". This is a puzzling statement and there is no reference to support it. Additionally, there are several sentences on page 15, beginning with "Text messaging interventions were associated with lower costs and increased ease of operation…", which are not supported by references.

Minor comments:

1. In the inclusion criteria, it says "To be included in this study, the patients had to have reading and writing skills necessary to complete their medical histories and the questionnaires independently". It is not clear how is was assessed in each study. Was an age cut-off used to choose which studies to include? More details are needed.

2. The 6003 citations described on page 10 does not match the total of 5302 in the Figure.

3. It would help to improve readability if subheadings were added to the results section for each of the subgroup analyses (e.g. age, intervention method, etc.)

4. What age cut-off was used to define the youth and adult groups?

5. Adding a brief summary of the contents of the various interventions included in this analysis to the results section would be helpful to the reader.

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.

Yes

Are the conclusions drawn adequately supported by the data shown?
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