Reviewer’s report

Title: Quality analysis of smart phone sleep apps in China: Can apps be used to conveniently screen for obstructive sleep apnea at home?

Version: 0 Date: 15 Jun 2019

Reviewer: Adam Dunn

Reviewer's report:

Thank you for the opportunity to review this manuscript. The manuscript is an analysis of software applications for use with obstructive sleep apnea. It was easy to read, nearly all of the necessary detail was included in the methods, and it was enjoyable and interesting to read. I have one major issue with the way the apps were evaluate against an evidence base, and one major issue with the way the apps were evaluated, which I think would need to be carefully clarified or re-done for the work to be valid. In what follows I have included a mix of major and minor comments roughly in chronological order, which I hope will improve the presentation of the research.

1. Abstract: I would have liked to have seen more detail in the methods to make it clearer how the score was defined. The conclusions could have been shorter to make room for longer methods.

2. Overall: Before I start reading the rest of the manuscript, my initial worry here is that apps are being used to replace expert diagnosis, so the most important aspect of any app is whether it is used as "screening" (to tell people to see a doctor) or "diagnosis" (to tell people they have sleep apnea, which is what I assume is meant by "evaluating" in the abstract). The wording in the abstract of "promising" worries me because it starts to feel like the authors are keen to see apps being used to increase the level of screening and in turn increase the sale of other devices in the marketplace. The first thing I did was to check the conflict of interest disclosures. Perhaps consider a conclusion that is more circumspect about what can actually be said about the results. If the range of diagnostic accuracies are not reported in the abstract, then "promising" may be a step too far.

3. Background: The background was concise and clear.
4. Aims: Perhaps replace "science-based" with "evidence-based".

5. Table 1. There is definitely not enough information in Table 1 and lines 117 to 122 to understand how the score was determined for the scientific basis. Just because an app mentions each of these items does not mean that it is evidence-based, does it? I don't understand how an app can address each of the items that are related to a standard PSG, or replace one or several of them with proxies that might have been validated and found to be closely correlated in a general population. I would imagine that most apps would ask people questions or perhaps take measurements from external devices. Each of those would need to be tested and validated to check that the "diagnosis" or "conclusion" they produce from the app (whether that is to tell a consumer to go to the doctor or to help a patient monitor their diagnosed sleep apnea). Presumably the evidence base to support the app would come from peer reviewed research that compares the app against a PSG (for diagnosis/screening)?

6. Evaluation Procedure: It appears that the scores were done by one person and then "checked" (but perhaps not independently). Because they weren't done independently there is no inter-rater reliability. Once the app ratings have been done independently, we would need to know the inter-rater reliability on the coding to determine whether the evaluation method was reliable and robust.

7. Results: I have no issues with the presentation of the results, other than the concern I have about whether the scientific basis actually measures what it is meant to measure.

8. Discussion: I wonder if the apps are not intended to be used as screening but may have different aims (i.e. to make money through advertising by providing something people like to use on an ongoing basis). Apps that are designed for screening may only need to be used once, whereas apps used to support patients after diagnosis will be used in an ongoing fashion. Perhaps more could be said about this as "missed opportunities" or added value.
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?
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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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