PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Current Status of Postnatal Depression Smartphone Applications available on Application Stores: An Information Quality Analysis
AUTHORS	Zhang, Melvyn; Ho, Roger; Loh, Alvona; Wing, Tracey; Wynne, Olivia; Chan, Sally; Car, Josip; Fung, Daniel Shuen Sheng

VERSION 1 – REVIEW

REVIEWER	Jorge Osma PhD. Associate Professor. Universidad de Zaragoza (Spain).
REVIEW RETURNED	17-Apr-2017

| GENERAL COMMENTS | The aim of this study as it appears in the manuscript was to identify the functionalities of postnatal apps and to determine the quality of their information content using the Silberg Scale.

The strength of this manuscript is to provide preliminary data about the information quality of the postnatal depression apps currently available in Smartphone apps stores. The manuscript highlights the current relevance of the m-health tools in the field of maternal depression prevention. The results could have an important implications for women (users), clinicians, developers, and researchers in e-Health and m-Health field.

I would like to congratulate the authors for the study (it is a good idea) and the results obtained, and also I would like to point out some changes in order to improve the manuscript, in my view.

Abstract

• Line 19-10: I suggest to change the sentence "...evaluating the potencial of m-health and smartphone applications for postnatal depression." for other sentence more related with the aim of the study such as: "...evaluating the information quality of the smartphone applications for postnatal depression".
• Line 26-27: I have also recommended to use the name of the validated scale used (Silberg Scale) instead of "using validated scales that have been applied..." (also in line 53 in the Introduction section and in line 16-17 in the Discussion section).

Limitations (this information appears before the Introduction section and also in the discussion section)

• In my view, to limited the search to postnatal Smartphone apps rather than using perinatal period (prenatal and postnatal), to consider only apps developed in English, and to use only two keywords are also limitations of the study. |
|---|---|

Especially when this is the first study regarding this important topic and the final number of apps analyzed were only 9. I strongly recommend to expand your search including at least Spanish apps.

Introduction

• I recommend to use abbreviations as WHO and app/apps (in all the manuscript). Also PND instead of postnatal depression.
• In the first paragraph the authors argue about morbidity and mortality as a consequence of postnatal depression, after that authors argue about prevalence data in Australia and Singapore. In the second paragraph authors explains the symptoms regarding postnatal depression and after that about consequences of having postnatal depression. I recommend to unified the information regarding the same topic (i.e., postnatal consequences) in the same paragraph in order to organize and understand better the information.
• Line 54-55: The authors must add a citation about "cognitive issues". Maybe this could be a good suggestion: Liu Y, Kaaya S, Chai J, McCoy DC, Surkan PJ, Black MM, Sutter-Dallay AL, Verdoux H, & Smith-Fawzi MC (2017). Maternal depressive symptoms and early childhood cognitive development: a meta-analysis. Psychol Med.,47(4):680-689. doi: 10.1017/S003329171600283X.
In addition, if the authors want to complete this information with outcomes regarding newborn's affective consequences from a longitudinal study , I suggest this paper: Korhonen, M., Luoma I., Salmelin, R., & Tamminem, T. (2012). A logitudinal study of maternal prenatal, postnatal and concurrent depressive symptoms and adolescent well-being. Journal of Affective Disorders, 136, 680-692.

• Remove the bold of the last paragraph in the Introduction section.

Methodology

• I strongly recommend to improve the flow chart figure adding the reasons of the rejection of the apps (as you did it once "1 duplicate removed"). The flow chart should answer the following questions: Why 54 apps were removed from the Android Store? and Why 3 apps were removed from the Apple Store? For more information I suggest this paper: Stovold et al. (2014). Study flow diagrams in Cochrane systematic review updates: an adapted PRISMA flow diagram. Systematic Reviews, 3:54 doi:10.1186/2046-4053-3-54

Results

• I strongly recommend to the authors to complete the Table 2 with the outcomes obtained in each Silberg Scale category of each apps analyzed. This is the most relevant data of the study and does not actually appear in the results section. The information of each app (and their functionalities) and the scores obtained in each Silberg Scale category will be interesting.

• I recommend to add a comment of the functionalities outcomes summarized in table 2. As I see it, 55.6% of the apps analyzed have an educational information functionality, 22.2% a depression assessment functionality, and 22.2% an intervention functionality through Yoga and Hypnosis.

This information must be discussed due the importance and necessity to use an standardized and validated assessment measures thought Smartphone's, and the lack of interventions based on CBT (evidence based interventions). This results are relevant and have important implications from a mental health point of view.

Discussion

• Line 14-15: It would be necessary to add a citation after the argument.
• Line 24-25: Please, add the mean and SD of the bariatric and cardiovascular apps mentioned in the text, it would be more informative to the reader.
• I have observed an inconsistency in the text that must be resolved or clarified. In lines 23-26 authors manifest that the mean obtained (3.1) in the study is significantly inferior as compared to other analysis conducted with other apps, but in lines 35-36 authors say "the scores we have obtained are largely similar" to those other apps (bariatric and cardiovascular).
• It seems that some Silberg Scale categories outcomes have not been mentioned in this section such as "attribution-sources". Why the lack of this information is important?

Conclusions

• Due the low prevalence of women's mortality as a consequence of postnatal depression and the high mental health impact in the majority of the mothers with diagnosis of postnatal depression, and also due the newborn's negative developmental consequences, I suggest to highlight these outcomes instead of the mortality ones in the beginning of the paragraph of this section.

REVIEWER	Fen-ju Chen I-Shou university, department of health administration, Taiwan
REVIEW RETURNED	22-Apr-2017

| GENERAL COMMENTS | 2. Is the abstract accurate, balanced and complete?
The section of results indicate only a limited number of applications are focused on postnatal depression disorder. The study excludes paid version application for further evaluation. If the decision is reasonable, the information should be provided.

3. Is the study design appropriate to answer the research question?
4. Are the methods described sufficiently to allow the study to be repeated?
9. Do the results address the research question or objective?
There are some questions regarding the study design. First, the limited case number hard to explain the validity of the study. This study utilize two keyword "postnatal" and "depression" to search subject web applications. However, another term "postpartum" may be interchangeable with postnatal. Second, the manuscript provide insufficient information of criteria in selection eligible applications. Nine out of sixty-seven applications are selected which yields only 13.4% of all applications found. Author may describe how may applications excluded are not in English language and not an application targeted for postnatal depressive disorder. |

It may make the study repeatable. Third, author may explain the reason why only download freely available version for further evaluation. If the study aims to reveal current status of information quality of postnatal depression smartphone applications available on application stores, there is a need to consider the quality of information of paid version applications too.

10. Are they presented clearly?
Table 3 does not include mean score 3.1 and standard deviation 1.8.
Page 2 line 28..."the average Silberg score was that of 3.33..." should be 3.1.
Page 2 line 29..."Only three out of the total 10 applications"...should be 9.

VERSION 1 – AUTHOR RESPONSE

Replies to Reviewer 1:
The aim of this study as it appears in the manuscript was to identify the functionalities of postnatal apps and to determine the quality of their information content using the Silberg Scale.

The strength of this manuscript is to provide preliminary data about the information quality of the postnatal depression apps currently available in Smartphone apps stores. The manuscript highlights the current relevance of the m-health tools in the field of maternal depression prevention. The results could have an important implications for women (users), clinicians, developers, and researchers in e-Health and m-Health field.

I would like to congratulate the authors for the study (it is a good idea) and the results obtained, and also I would like to point out some changes in order to improve the manuscript, in my view.
We thank you peer reviewer 1 for recognizing the quality of our work and for providing your kind recommendations. Please refer to our in-line comments to your recommendations.

Abstract
Comment:
• Line 19-10: I suggest to change the sentence "...evaluating the potencial of m-health and smartphone applications for postnatal depression." for other sentence more related with the aim of the study such as: "...evaluating the information quality of the smartphone applications for postnatal depression".
• Line 26-27: I have also recommended to use the name of the validated scale used (Silberg Scale) instead of "using validated scales that have been applied..." (also in line 53 in the Introduction section and in line 16-17 in the Discussion section).

Limitations (this information appears before the Introduction section and also in the discussion section)

Response: We have removed the limitations section that has been inappropriately placed at the start of the manuscript.

Comment: In my view, to limited the search to postnatal Smartphone apps rather than using perinatal period (prenatal and postnatal), to consider only apps developed in English, and to use only two keywords are also limitations of the study. Especially when this is the first study regarding this important topic and the final number of apps analyzed were only 9. I strongly recommend to expand your search including at least Spanish apps.

Response: We thank you for highlighting additional limitations of our study, to which we have taken into consideration and have amended the limitations session appended at the end of the discussion accordingly.
We have made use of additional keywords to try to identify as many applications as possible. These keywords include that of "postnatal", "pregnancy", "perinatal" and "depression". Using these keywords, we managed to identify a total of 59 applications. We have considered the need to include applications that are available in other language, but unfortunately, we do need to exclude these applications and include only English application in order to systematically review the applications using the validated scale. We have updated our selection criteria and we have evaluated a total of 14 applications.

Introduction
Comments:
• I recommend to use abbreviations as WHO and app/apps (in all the manuscript). Also PND instead of postnatal depression.

Response: We have made use of the recommended abbreviations.

• In the first paragraph the authors argue about morbidity and mortality as a consequence of postnatal depression, after that authors argue about prevalence data in Australia and Singapore. In the second paragraph authors explains the symptoms regarding postnatal depression and after that about consequences of having postnatal depression. I recommend to unified the information regarding the same topic (i.e., postnatal consequences) in the same paragraph in order to organize and understand better the information.

Response: We have merged paragraphs 1 and 2 together. We have started off the introduction by stating the prevalence and epidemiology of PND globally, based on the WHO report. We then introduced the core symptoms associated with PND. We then highlighted the consequences of PND for mothers, as well as their children.

• Line 54-55: The authors must add a citation about "cognitive issues". Maybe this could be a good suggestion: Liu Y, Kaaya S, Chai J, McCoy DC, Surkan PJ, Black MM, Sutter-Dallay AL, Verdoux H, & Smith-Fawzi MC (2017). Maternal depressive symptoms and early childhood cognitive development: a meta-analysis. Psychol Med.,47(4):680-689. doi: 10.1017/S003329171600283X.
In addition, if the authors want to complete this information with outcomes regarding newborn's affective consequences from a longitudinal study , I suggest this paper: Korhonen, M., Luoma I., Salmelin, R., & Tamminem, T. (2012). A logitudinal study of maternal prenatal, postnatal and concurrent depressive symptoms and adolescent well-being. Journal of Affective Disorders, 136, 680-692.

Response: Thank you for the provision of these important references. There are especially of significance to PND and serve to highlight why active screening and early interventions are essential. We have included both these references in our paper.

• Remove the bold of the last paragraph in the Introduction section.

Response: We have made the necessary changes. We have stated that the aim of the current research was to identify not only the common functionalities of postnatal application, but also to determine the quality of the information content of postnatal depression using validated scales that have been applied for applications in other specialities.

Methodology

• I strongly recommend to improve the flow chart figure adding the reasons of the rejection of the apps (as you did it once "1 duplicate removed"). The flow chart should answer the following questions: Why 54 apps were removed from the Android Store? and Why 3 apps were removed from the Apple Store? For more information I suggest this paper: Stovold et al. (2014). Study flow diagrams in Cochrane systematic review updates: an adapted PRISMA flow diagram. Systematic Reviews, 3:54 doi:10.1186/2046-4053-3-54

Response: We thank you Peer Reviewer 1 for your clarifications with regards to our flow chart diagram and for highlighting the PRISMA flow diagram reference to us. As we have revised our search terminologies, an updated search was conducted. In our revised Figure 1, we have highlighted the absolute number of postnatal applications that we have acquired from the respective stores. We have stated the number of applications that were excluded due to language issues.
We have also highlighted in our flow-chart how additional applications are excluded as they did not fulfil our inclusion criteria. The rationale for exclusion are explicitly stated, in that some of these excluded as they were related to pregnancy but not to postnatal depression, or were application that required specific activation codes.

Results

• I strongly recommend to the authors to complete the Table 2 with the outcomes obtained in each Silberg Scale category of each apps analyzed. This is the most relevant data of the study and does not actually appear in the results section. The information of each app (and their functionalities) and the scores obtained in each Silberg Scale category will be interesting.

Response: We have inserted the total score for each of the applications in Table 2. We will include the individual scores for each of the applications as a supplementary file accompanying this submission.

• I recommend to add a comment of the functionalities outcomes summarized in table 2. As I see it, 55.6% of the apps analyzed have an educational information functionality, 22.2% a depression assessment functionality, and 22.2% an intervention functionality through Yoga and Hypnosis. This information must be discussed due the importance and necessity to use an standardized and validated assessment measures thought Smartphone's, and the lack of interventions based on CBT (evidence based interventions). This results are relevant and have important implications from a mental health point of view.

Response: Thank you for your suggestion. We acknowledge that it will be of importance to discuss the core functionalities of these applications, in order to state the limitations of the existing postnatal applications and to recommend the next step forwards towards having more postnatal applications with better information quality and evidence base.

Discussion
• Line 14-15: It would be necessary to add a citation after the argument.

Response: We have inserted the necessary citation.

• Line 24-25: Please, add the mean and SD of the bariatric and cardiovascular apps mentioned in the text, it would be more informative to the reader.

Response: We have inserted the mean scores for the bariatric and cardiovascular applications.

• I have observed an inconsistency in the text that must be resolved or clarified. In lines 23-26 authors manifest that the mean obtained (3.1) in the study is significantly inferior as compared to other analysis conducted with other apps, but in lines 35-36 authors say "the scores we have obtained are largely similar" to those other apps (bariatric and cardiovascular).

Response: We seek to clarify that the scores we have obtained in our current research is not inferior to that of prior research involving other applications. The score we obtained is intermediate, in that it is lower than that for obesity applications, but more than that for cardiovascular applications.

• It seems that some Silberg Scale categories outcomes have not been mentioned in this section such as "attribution-sources". Why the lack of this information is important?

Response: Thanks for the suggestion. We have included a paragraph on attribution sources and references for information found within the application.

Conclusions
• Due the low prevalence of women's mortality as a consequence of postnatal depression and the high mental health impact in the majority of the mothers with diagnosis of postnatal depression, and also due the newborn's negative developmental consequences, I suggest to highlight these outcomes instead of the mortality ones in the beginning of the paragraph of this section.

Response: We have made the necessary changes.

Reviewer: 2
Reviewer Name: Fen-ju Chen
Institution and Country: I-Shou university, department of health administration, Taiwan
Please state any competing interests:
None declared

Please leave your comments for the authors below
We thank you reviewer 2 for your recommendations. We have made the necessary amendments based on your recommendations.

2. Is the abstract accurate, balanced and complete?
The section of results indicate only a limited number of applications are focused on postnatal depression disorder. The study excludes paid version application for further evaluation. If the decision is reasonable, the information should be provided.

Response: We have re-extracted both paid as well as free version of postnatal applications from the respective app stores for evaluation.

3. Is the study design appropriate to answer the research question?

4. Are the methods described sufficiently to allow the study to be repeated?

9. Do the results address the research question or objective?
There are some questions regarding the study design. First, the limited case number hard to explain the validity of the study. This study utilize two keyword "postnatal" and "depression" to search subject web applications. However, another term "postpartum" may be interchangeable with postnatal. Second, the manuscript provide insufficient information of criteria in selection eligible applications. Nine out of sixty-seven applications are selected which yields only 13.4% of all applications found. Author may describe how may applications excluded are not in English language and not an application targeted for postnatal depressive disorder. It may make the study repeatable. Third, author may explain the reason why only download freely available version for further evaluation. If the study aims to reveal current status of information quality of postnatal depression smartphone applications available on application stores, there is a need to consider the quality of information of paid version applications too.

Response: We have expanded the number of search terms utilized to search for the respective postnatal applications.
We have revised Figure 1 (Flow-Chart) to better illustrate our selection of the articles.

10. Are they presented clearly?
Table 3 does not include mean score 3.1 and standard deviation 1.8.
Page 2 line 28..."the average Silberg score was that of 3.33..." should be 3.1.
Page 2 line 29..."Only three out of the total 10 applications"...should be 9

Response: We have corrected the methodology section as well as the results section.

VERSION 2 – REVIEW

REVIEWER	Jorge Osma
	Universidad de Zaragoza (Spain)
REVIEW RETURNED	10-Jul-2017

| GENERAL COMMENTS | The authors have included the majority of the suggestions and recommendations to the new version of the manuscript. Thanks for your effort and the results obtained in this study because will encourage researchers working in the prevention of perinatal depression through ICT's to take into consideration the information quality of the apps we are developing. Thanks and congratulations. |

REVIEWER	Fen-ju Chen
	I-Shou University , Taiwan
REVIEW RETURNED	20-Jul-2017

GENERAL COMMENTS	Abstract
	The authors has made lots of changes in the abstract section. My suggestions as follows:
	1. There are two aims in this manuscript, but the title and main idea of this manuscript is to evaluate information quality of existing application of PND.

	I suggest to describe the main aim before the aim of identifying some common functionalities of postnatal application. 2. Line22. The year of conducting search is to leave out. 3. Setting up the criteria for selecting applications only in English language. It is acceptable. It may be the limitation of study. The authors may provide information regarding authors' consideration. I suggest to alter the expression "must be in English" into a moderate statement. 4. I suggest to delete the intervention. Since there is no intervention. Introduction The manuscript states that the current trend of E-health and M-health and importance of PND to harm new postpartum women and newborn. However, there is insufficient statement in discussion on the value of providing quality of information. I suggest that the authors may adding references regarding the importance of information quality. Methodology L23 : " at the end, a total of 15 applications" It is inconsistent with figure1. Result Information quality analysis 1. In the first paragraph, it states " the average Silberg score was that of 3.0 with a standard deviation of 1.52," I suggest to add the information to the table3. 2. L22:" 8 out of the total 15 applications" Need to be corrected! 3. Title of table 3 is fail to include 4. I suggest to check the statistic number in this section. The number is not consistent with the table 3.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Jorge Osma
Institution and Country: Universidad de Zaragoza (Spain)
Please state any competing interests: none declared

Please leave your comments for the authors below

Comment: The authors have included the majority of the suggestions and recommendations to the new version of the manuscript. Thanks for your effort and the results obtained in this study because will encourage researchers working in the prevention of perinatal depression through ICT's to take into consideration the information quality of the apps we are developing. Thanks and congratulations.

Response: We thank you Reviewer 1 for your kind comments and we do hope that this would inspire more researchers to look into this area, as postnatal depression has an impact not only on mothers but also on the new born.

Reviewer: 2
Reviewer Name: Fen-ju Chen
Institution and Country: I-Shou University , Taiwan
Please state any competing interests: None declared

Please leave your comments for the authors below

Abstract
The authors has made lots of changes in the abstract section. My suggestions as follows:
1. There are two aims in this manuscript, but the title and main idea of this manuscript is to evaluate information quality of existing application of PND.
I suggest to describe the main aim before the aim of identifying some common functionalities of postnatal application.

Response: We thank you for this recommendation. Please find as enclosed the revision:
Given this, it is the main aim of the current research to determine the quality of the information content of postnatal application using validated scales that have been applied for applications in other specialties. It is also the secondary aim of the current research to systematically characterize some of the common functionalities of postnatal applications.

2. Line22. The year of conducting search is to leave out.

Response: We like to apologize for this and we have defined the duration period: 20th May 2017 through to 31st May 2017.

3. Setting up the criteria for selecting applications only in English language. It is acceptable. It may be the limitation of study. The authors may provide information regarding authors' consideration. I suggest to alter the expression "must be in English" into a moderate statement.

Response: We have amended the sentence to mention that those applications which were not in English were not considered as the authors have had difficulties with evaluation of the applications due to language barriers. We definitely acknowledge that the requirement that they are in English is an inherent limitation of the current study.

4. I suggest to delete the intervention. Since there is no intervention.

Response: We have modified the terminology to that of technologies instead of intervention.

Introduction
Comment: The manuscript states that the current trend of E-health and M-health and importance of PND to harm new postpartum women and newborn. However, there is insufficient statement in discussion on the value of providing quality of information. I suggest that the authors may adding references regarding the importance of information quality.

Response: We have amended the manuscript by adding in this: ". It is of importance to recognize that the NICE guidelines [10] recommend the provision of pertinent information related to mental health to all women of childbearing potential. Information provision to postnatal mothers is of utmost importance as prior research (Youash S et al., 2013) have highlighted that there was a correlation with the amount of pre-and postnatal health information provided and the subsequent scores on the depressive scale [20]. There has also been research highlighting the importance or prenatal education in ensuring that women receive information about postnatal depression [21].

Methodology
L23 : " at the end, a total of 15 applications" It is inconsistent with figure1.

Response: We have corrected this to 14 applications.

Result
Information quality analysis
1. In the first paragraph, it states " the average Silberg score was that of 3.0 with a standard deviation of 1.52,"
I suggest to add the information to the table3.

Response: We have amended this and added the average score to the table.

2. L22:" 8 out of the total 15 applications"
Need to be corrected!

Response: We have amended this.

3. Title of table 3 is fail to include

Response: We have amended this.

4. I suggest to check the statistic number in this s|ection. The number is not consistent with the table 3.

Response: We apologized for the mistake and we have amended it accordingly.
The current gaps in the information quality pertains to the currency of the application (whether there have been any modifications in the past month) (0.0), as well as the disclosure of the affiliations (0.143), identification of the authors (0.143) and credentials of the authors (0.071). In addition, a good proportion of the applications also did not disclose whether there are sponsorship for the application (0.071).

VERSION 3 – REVIEW

REVIEWER	Fenju Chen I-shou university ,Taiwan
REVIEW RETURNED	11-Sep-2017

GENERAL COMMENTS	The authors have included the majority of the suggestions and recommendations to the new version of the manuscript.