PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	A Qualitative Study to Elicit Patients' and Primary Care Physicians'
	Perspectives on the Use of a Self-management Mobile Health
	Application for Knee Osteoarthritis
AUTHORS	Barber, Tanya; Sharif, Behnam; Teare, Sylvia; Miller, Jean;
	Shewchuk, Brittany; Green, Lee; Marlett, Nancy; Cibere, Jolanda;
	Mrklas, Kelly; Wasylak, Tracy; Li, Linda; Campbell-Scherer, Denise;
	Marshall, Deborah

VERSION 1 – REVIEW

REVIEWER	Jenny Setchell
	The University of Queensland
REVIEW RETURNED	25-May-2018

Overview
This paper is well written overall and has interesting findings (a mismatch between patient and physician understandings of the severity of KOA). However, despite the clear writing style, I find the paper difficult to follow – this is mainly due to what I believe is a mismatch in the description of the <i>stated study objectives</i> and the actual <i>research undertaken and described</i> in this manuscript (see below for details). There are also some areas where there is insufficient information about the methodology and results reporting. There is also potentially a sample size issue (with the patient sample).
Major issues
Objective mismatch:
The goal is stated throughout the manuscript as per in the title "elicit patient and primary care physicians' perspectives on the use of a self-Mx mHealth app for KOA". However, the study reported on in this manuscript seems to be quite different. It seeks patient and physician perspectives on knee OA not an mHealth app. This problem recurs throughout the paper. What is most concerning is the big leap between the results (a discord between patient and physicians understandings of KOA) and the conclusion (we need a patient self-management app). Perhaps the authors have conflated

scope of this paper?

There is also possibly an issue with sample size – see below for details.

Minor issues

Strengths and Limitations bullet points

- Too much undefined terminology in the first two bullet points in the strengths and limitations (what are 'PaCER' 'mental models', 'Cognitive Task Analysis', 'knowledge work'). Perhaps simplify so that readers will be able to engage quickly with the study.
- Final bullet point (and speaking more broadly to an issue with the study procedure) – the reasons outlined here for not obtaining an adequate sample size are not acceptable. The population sampled is large so there should be plenty of people to draw from (there are many physicians who treat KOA, and people with KOA due to the commonality of the condition). Time commitment is also an unacceptable reason - many similar studies have been conducted interviews with 3-5 times these numbers of participants. There is no set sample size for a qualitative study (sometimes an n of 1 is justified) but the context must be considered – if you are trying to comment on people's understandings of KOA, and to develop an app that will used by many people across various circumstances, a larger sample size would most likely be appropriate. In the method section the sample size of the physicians is well justified (because of the depth of the inquiry - but this is then not a limitation of the study). However, 'patients' sample size is not well justified. This could be a major issue if the authors cannot adequately justify this sampling issue. See also my comments below under the Method section.

Abstract

Design – no mention of the analysis method used (only describes data collection techniques).

Method

As discussed above, the sample size was justified well in the case of physicians (so this is in fact not a limitation – nor was the sample size limited due to the reasons listed in the strengths and limitations bullet points)

Researcher reflexivity for the physician interviews? Who conducted the interviews? What effect might this have had on the focus of the discussions/results.

PaCER and Patient Involvement

The second paragraph of this subsection contains a number of unclear statements:

- The sentence from line 3 to 33 (p6) confuses a number of methodological and theoretical concepts. The concept of 'lived experience' comes from theoretical concepts developed in phenomenology, as does (at least in part) the research methodology 'grounded theory'. The PaCER approach perhaps stems from these things too?
- When discussing the PaCER method it is unclear when the authors are talking about this study or more broadly about PaCER methods in general. Good to keep to returning to how PaCER is used in this study.
- Define what is meant by a 'data event'.
- Line 36 who are 'these patients' (I could tell if it was referring to the researcher patients, the patient participants)?

Patient research participants

As mentioned justification needs to be given for the sample size here. Again in contrast to the physician interviews, there was no discussion of attempts to include a range of different perspectives and individuals.

Patient Reasearch Data collection and analysis

- Were the PaCER researchers involved in developing the interview guide? The first sentence here could use the active voice to clarify: Some of the researchers (xx and yy) developed the interview guide which was approved by the entire research team.
- Line 53-55 is quite a generalisation without citation "as is the nature of patients talking to other patients, the interviews became a three-way conversation". Perhaps just say that the interviewers (as patient researchers) took an active role in the discussions (describe how, consider providing brief examples) this could be discussed when the interview quide is described (see the next bullet point)
- P7 line 3-8 Sorting the data as per the questions set out in the interview guide is not analysis/coding – really this is just sorting the data – I suggest removing this statement. It

would be helpful to put this (or similar) summary of the interview questions earlier on though when the interview guides are described. Also discuss if these were these fixed questions (structured – le were the same questions used for each participant?) or semi-structured. There are questions directly about the app in the interview guide but these do not seem to be discussed here or included in the results. This should be explained in the manuscript - although I may have missed something?.

 There needs to be a much more in depth description of the analysis process. Eg how were the 'key messages' determined? What type of analysis did you use (a citation would be helpful here). Who was involved in the process, what effect this might have, how were discrepancies dealt with etc.

Comparison of EnACt and PaCER data – again more detail needed here regarding the process of comparison – how was this done, who specifically was involved (all authors?) how were the points of contrast identified. The results of this comparison should be included in the results – or if the comparison is just made in the discussion, then the comparison process should be left out of the method section.

Results

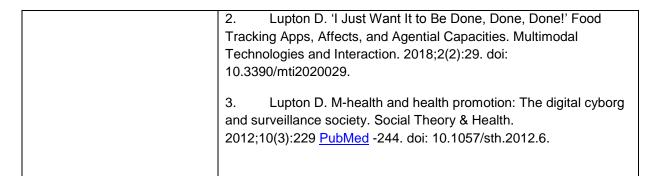
Very simple, more detail could be included here (see above about the results of the comparison – do not speak to thesecond part of the patient interview. No pseudonyms used, no participant characteristics (so that the quotes can be contextualised by readers). Nothing about patient or physician perspectives on apps.

Discussion

Need to make sure the discussion relates to the results and does not extend too far beyond them (see major issues above).

Lack of acknowledgement of potential problems with 'self-tracking' health apps etc (e.g. puts the onus of the work on the patient not the healthcare worker, can create shame and guilt) – see for example some of Deborah Lupton's extensive work on this topic.

1. Lupton D. M-health and health promotion: The digital cyborg and surveillance society. Social Theory & Health. 2012;10(3):229 PubMed -244. doi: 10.1057/sth.2012.6.



REVIEWER	Dr Joanna Smith
	University of Leeds, UK
REVIEW RETURNED	04-Jul-2018

GENERAL COMMENTS This is an interesting and highly relevant article and although extremely well written, the purpose is unclear. The background is clear, the aim is well stated, although adding that the findings were used to inform development of App -page 4 above methods is confusing and would be better in the discussion. The methods could be streamlined and dominate the paper, and need to focus on what was undertaken in the study presented – methods appear to report the whole study- therefore it is difficult to ascertain what methods were relevant to the study being reported. The reference to a range of qualitative approaches (page 6 phenomenology and grounded theory etc.) is neither needed nor appropriate. There seems to be inconsistent between the aim, data collection and findings reported. How was information collected about using an eHealth intervention from GPs. does this study report findings from part 2 in Appendix B (and if not then this information is not required). More detail is required on how qualitative data was combined (page 7). The findings seem to report mainly perspectives about how KOA is conceptualized? The discussion suggests there were in-depth interviews but the findings are rather superficial / brief. The findings would benefit from clear themes where the perspectives of physicians and parents could be brought together under 'themes' as 'conceptualization of KOA', 'Patient-physician relationship building' etc. comparing and contrasting perspectives rather than presenting separately, as this is does not really bring the findings together. 'Mental models of care' seems an unusual term. Page 8 has a paragraph that is really discussion 'these findings mirror...'. The discussion is well written and does draw on the findings to some extent. This is an interesting and highly relevant article, the methods would benefit from restructuring and more dynamic / detailed presentation of the findings.

REVIEWER	Enrica Papi
	Imperial College London, UK
REVIEW RETURNED	04-Jul-2018

GENERAL COMMENTS	This manuscript sets out to identify the perspective of knee
	osteoarthritis patients and clinicians on the use of a mobile health

application. Despite the interesting and hot topic discussed it is felt as if the manuscript does not answer the research question. Findings are not shown about the preferences of patients and clinicians on the use of the app but more on the view of OA in general and current practice. That is fine but then the aim needs to be revised. Moreover a main concern is the really small population sample. Qualitative studies on similar matters are reported in the literature with bigger numbers of participants. Was information saturation achieved with the group assessed? Increasing the sample size will strengthen the paper.

The introduction could also be expanded to touch base on the likelihood of technological barrier in OA patients as they tend to be of the older spectrum. This will set more the context of this study. Methods are really lengthy and intricate to follow, the use of some diagrams may help to clarify the different steps taken. Also what kind of methods of qualitative data analysis was used? Which was the agreement within each group?

It is not clear how the results reported informed the co-design phase if no results are provided on the needs of patients and clinicians.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

1.1 Many thanks for the opportunity to review this interesting and well written paper.

Author Response: We are pleased you enjoyed the article.

1.2 Objective mismatch: The goal is stated throughout the manuscript as per in the title "elicit patient and primary care physicians' perspectives on the use of a self-Mx mHealth app for KOA". However, the study reported on in this manuscript seems to be quite different. It seeks patient and physician perspectives on knee OA not an mHealth app.

Author response: We thank the reviewer for this comment. Both patient and physicians interviews were conducted to elicit participants" perspective on KOA, management of KOA in addition to the benefits of using an App. We agree that in the previous version there was a mismatch between objective and results, and therefore, in the revised version, we provided results on all questions. We have made changes to the abstract (page 3) and within the introduction (lines 8-11) to clarify the purpose of the article "To elicit perspectives of family physicians and patients with knee osteoarthritis (KOA) on KOA, its treatment/management and the use of a mobile health application (app) to help patients self-manage their KOA" We also made some clarifying edits to the results and discussion in order to link findings more clearly with our purpose (Lines 198-233, 234-261, 262-313, 314-333, 334-405) as reflected in track changes.

1.1. Minor issues: Too much undefined terminology in the first two bullet points in the strengths

Author response: Thank you for the suggestion. We have modified the text in the two bullet points to address these points (page 3).

1.2. Sample size for patients: Justification needs to be provided

Author response: Our intention was to give a frame of reference for exploring future co-design work

and, as such, our sample size was sufficient for this purpose. However, this does mean that we may not have captured the full nuance of variability in the area. We have listed this in our limitations at the beginning of the article (page 3), as well as in the discussion (lines 400-405). We also provided more details for the sampling procedure conducted by PaCER (lines 135-137, 140-142). Patient participants were recruited from those who had taken part in our previous OA PaCER studies and expressed interest in providing input on the use of an mHealth tool. The purposive sampling took into account the variability of patients in terms of disease severity and age (Lines 140-142).

1.3. Abstract: Design- no mention of the analysis method used

Author response: Thank you for your suggestion. We have added the specific methodology used for patient and physician interview in the abstract (page 3).

1.4. Researcher reflexivity for the physician interviews? Who conducted the interviews? What effect might this have had on the focus of the discussions/results.

Author response: Thank you for this observation. Interviews were conducted by a group of experienced improvement advisors with specialized training in CTA who were intentionally selected due to their established relationship with physicians. We have clarified this in the text (Lines 52-55).

1.5. PaCER and Patient Involvement: The second paragraph of this subsection contains a number of unclear statements.

Author response: We have modified this paragraph to clarify PaCER methods and that this study builds upon previous studies to understand patient perspectives about their disease, managing KOA and if they would use an mHealth tool to monitor their disease status. Wordings for "Data event" and "these patients" as noted by the reviewer were corrected (Lines 115-133).

1.6. Patient Research data collection and analysis: Clarification needed (who developed the interview guide?; clarify three-way conversation: suggest "Interviewers (as patient researchers) took an active role in the discussions..."; clarify the analysis sorting vs coding; clarify if interviews were structured or semi-structured).

Author response: We have modified this section according to the comments and sentence suggestions by the reviewer in order to better clarify (Lines 148-168). The description of the interview guide and its development has been discussed first (Lines 148-151). Finally, more in-depth description of the analysis methods were provided to clarify the analysis of patients' interview data (Lines 158-168) This included our description of a systematic process of searching/sorting and arranging the interview transcripts to identify key messages. By identifying significant patterns among patient responses to the questions delineated in the interview guide, and drawing meaning from such patterns, PACER researchers identified key messages for: 1) information related to participants' visits to their family physicians about their KOA; 2) management and treatment options; and 3) patients' perspectives on a tool to help them and their physicians monitor their KOA and self-management strategies (Lines 158-168).

1.7. Comparison of the EnACt and PaCER data: more detail needed here regarding the process of comparison

Author response: Thank you for your suggestion. We have provided details of the team members (PaCER and EnACt) who met to review and compare the findings (Lines 172-173). We further provided details of the methodology for consensus processes according to Hill et al. [new reference added] (Lines 173-179). We also modified the results section to reflect the results of the comparisons of PaCER and EnACt data (Lines 198-233, 234-261, 262-313, 314-333).

1.8. Results: Very simple, more detail could be included here: pseudonyms or characteristics to contextualize the quoted by the reader.

Author response: We have restructured the result section to add clarity to three components of results: 1) Conceptualization of KOA; 2) Patient-Physician Relationship; and 3) The Use of an mHealth Tool (Lines 198-233, 234-261, 262-313, 314-333). We have described characteristics of patients and physicians samples in the method section (Lines 69-89 for physicians and Lines 135-145 for patients) in order to provide participant context for the reader. We chose not to include pseudonyms during our research and decided not to provide further characterization of participants in the result section to prevent including any identifiers and thus secure the anonymity of our participants given our sample size.

1.9. Discussion: Need to make sure the discussion relates to the results and does not extend too far beyond.

Author response: Agreed. We have modified the discussion section to address the points only related to the results. We provided the summary of findings on contrasting perspectives of patients and physicians and also described the application of this study in co-designing mHealth tools [Lines 344-386] and deleted discussions that were out of the scope of this study.

- 1.10. Discussion: Lack of acknowledgement of potential problems with 'self-tracking' health apps including shame and guilt. See Deborah Lupton's work:
- Lupton D. M-health and health promotion: The digital cyborg and surveillance society. Social Theory & Health. 2012;10(3):229-244. doi: 10.1057/sth.2012.6.
- Lupton D. 'I Just Want It to Be Done, Done, Done!' Food Tracking Apps, Affects, and Agential Capacities. Multimodal Technologies and Interaction. 2018;2(2):29. doi: 10.3390/mti2020029.

Author response: Thanks for this suggestion. We have indicated the potential problems that patients face in feeling shame or guilt when using mHealth apps [Lines 375-378] and cited the papers you suggested from Lupton et al. regarding these issues. As this was not an issue identified by our participants in this study, we did not include further discussion.

Reviewer: 2

2.1 This is an interesting and highly relevant article and although extremely well written, the purpose is unclear.

Author Response: We have made changes to the abstract (page 3) and within the introduction (lines 8-11) to clarify the purpose of the article "To elicit perspectives of family physicians and patients with knee osteoarthritis (KOA) on KOA, its treatment/management and the use of a mobile health application (app) to help patients self-manage their KOA" We also made some clarifying edits to the results and discussion in order to link findings more clearly with our purpose (Lines 198-233, 234-261, 262-313, 314-333, 334-405) as reflected in track changes.

2.2 The background is clear, the aim is well stated, although adding that the findings were used to inform development of App page 4 above methods is confusing and would be better in the discussion.

Author Response: Thank you for the suggestion. After considering this, we have moved this section to the discussion as you suggested (lines 344-386).

2.3 The methods could be streamlined and dominate the paper, and need to focus on what was undertaken in the study presented - Methods appear to report the whole study- therefore it is difficult to ascertain what methods were relevant to the study being reported.

Author Response: Agreed. We have clarified why we mention the two earlier studies as a foundation going forward (lines 118-120) and removed details of previous studies that were not the focus of this work (Lines 117-120,135-137).

2.4 The reference to a range of qualitative approaches (page 6 phenomenology and grounded theory etc.) is neither needed nor appropriate

Author Response: After consideration we have removed this reference as suggested.

2.5 There seems to be inconsistent between the aim, data collection and findings reported. How was information collected about using an eHealth intervention from GPs.

Author Response: This is an excellent point, and an oversight on our part. We have included more details in terms of asking for patient and physician perspectives as to whether they would use an mHealth tool, and including our findings around their contrasting opinions (patients were enthusiastic whereas physicians were concerned about usability, within the methods (Lines 43, 66-67, 149-151, 156-157, 167, 176) and results (Lines 186-188, 314-333).

2.6 Does this study report findings from part 2 in Appendix B (and if not then this information is not required).

Author Response: We have clarified that the interview guide (Appendix B) is the guide used to understand patient perspectives on KOA, self-management and using an mHealth tool (Lines 148-159) and the findings from part 2 is reported in the results sections starting at line 314.

2.7 More detail is required on how qualitative data was combined (page 7).

Author Response: Thank you, we have provided further clarification at the end of the methods section on how the team came together and used a consensus process to agree on the conceptualization of KOA, and use of mHealth tool for KOA, by patients and physicians (Lines 172-179).

2.8 The findings seem to report mainly perspectives about how KOA is conceptualized? The discussion suggests there were in-depth interviews but the findings are rather superficial / brief.

Author Response: Again, thank you for this insight. We have clarified that we did ask participants about KOA, its management, and using an m-health tool and we have included broader details within the results section and in the discussion (lines 189-333; 344-405).

2.8.1 The findings would benefit from clear themes where the perspectives of physicians and parents could be brought together under 'themes' as 'conceptualization of KOA', 'Patient-physician relationship building' etc. comparing and contrasting perspectives rather than presenting separately, as this is does not really bring the findings together.

Author Response: We appreciate this observation and have grouped findings in the following themes: Conceptualization of KOA (line 198); Treatment and Management of KOA (line 234); Patient-Physician Relationship (line 262); and Use of an mHealth tool (line 314), in order to bring the findings together in a clear manner.

2.8.2 Mental models of care' seems an unusual term.

Author Response: Cognitive Task Analysis is used specifically to elicit an individual or team's "mental model" (their understanding of what a concept, in this case KOA, is how it happens, how they treat it, but also of what types of actions will produce what results under what circumstances. Explained in Lines 64-66 &80-84. It is linked to the methodology and literature of Cognitive Task Analysis. We have defined it in the methods section and referenced it. So while it may be unusual, it is a valid and defined term within this article.

2.9 Page 8 has a paragraph that is really discussion 'these findings mirror...'

Authors Response: Agreed. This paragraph has been removed.

2.9.1 The discussion is well written and does draw on the findings to some extent.

Author Response: Thank you, we have added further discussion on the patient and physician perceptions of using an mHealth tool (lines 344-358) to strengthen the connection to our findings.

2.9.2 This is an interesting and highly relevant article, the methods would benefit from restructuring and more dynamic / detailed presentation of the findings.

Authors Response: Agreed. We hope that the changes we have made in the methods section confirming that previous studies were a starting point but the current study focused on understanding patient perspectives on KOA, self-management and using an mHealth tool (lines 116-122,135-137) and the restructuring to include themes in the results section (lines 198-333) will address this need.

Reviewer: 3

3.0 This manuscript sets out to identify the perspective of knee osteoarthritis patients and clinicians on the use of a mobile health application. Despite the interesting and hot topic discussed it is felt as if the manuscript does not answer the research question.

Author Response: Thank you for this observation. We have made changes to the abstract (page 3) and within the introduction (lines 8-11) to clarify the purpose of the article "To elicit perspectives of family physicians and patients with knee osteoarthritis (KOA) on KOA, its treatment/management and the use of a mobile health application (app) to help patients self-manage their KOA" We also made some clarifying edits to the results and discussion in order to link findings more clearly with our purpose (Lines 198-233, 234-261, 262-313, 314-333, 335-386) as reflected in track changes. We hope this addresses the required clarification.

3.1 Findings are not shown about the preferences of patients and clinicians on the use of the app but more on the view of OA in general and current practice. That is fine but then the aim needs to be revised.

Author Response: Agreed. We have included findings under the theme Use of an mHealth tool in our results section (lines 314-333) to link findings more clearly with our purpose.

3.2 Moreover a main concern is the really small population sample. Qualitative studies on similar matters are reported in the literature with bigger numbers of participants.

Author Response: Our intention was to give a frame of reference for exploring future co-design work and, as such, our sample size was sufficient for this purpose. However, this does mean that we may

not have captured the full nuance of variability in the area. We have listed this in our limitations at the beginning of the article (page 3), as well as in the discussion (lines 400-405).

3.3 Was information saturation achieved with the group assessed? Increasing the sample size will strengthen the paper.

Author Response: Our intent was not saturation but to obtain useful information that would advance our knowledge about patients and physicians using an mHealth tool as well as the co-design process itself (lines 80-84, 400-405). In addition, CTA studies are often based on small samples since the goal is to seek understanding. (See our references #14 Crandall, Klein, Hoffman 2006).

3.4 The introduction could also be expanded to touch base on the likelihood of technological barrier in OA patients as they tend to be of the older spectrum. This will set more the context of this study.

Author Response: Interestingly, this was an issue that physicians brought to our concern, but was not an issue that patients reported as a concern or barrier. We have included this in our results section (lines 314-333) and our discussion (lines 349-358).

3.5 Methods are really lengthy and intricate to follow, the use of some diagrams may help to clarify the different steps taken.

Author Response: Thank you for this suggestion. After consideration and discussion with our research team, we feel the changes we have made will help clarify the methods section and thus address these concerns without the need of diagrams.

3.5.1 Also what kind of methods of qualitative data analysis was used?

Author Response: We have explained the methods of data analysis in the manuscript. Cognitive Task Analysis is used to reveal experienced individuals' or teams' thinking in performing knowledge work in real-world contexts. It uses specialized interview methods and framework-guided analysis to uncover the crucial processes, known generically as "macrocognition," and Team analysis meetings were held to derive detailed descriptions of each subject's mental model of KOA and their approach to each macrocognition process around KOA (Lines 56-67, 109-113). PaCER method is a participatory research approach involving patients in three phases: set, collect, and reflect to define the objectives, collect the data, and understand the findings. PaCER researchers analyzed data for key messages related to participants' perceptions about their KOA, on a tool to help them and their physicians monitor their KOA and self-management strategies (lines 123-133, 158-168).

3.5.2 Which was the agreement within each group?

Author Response: We have clarified the group comparison of data in the methods section- this was a consensus process in which the team came together and agreed on conceptualization of KOA and use of an mHealth tool (lines 172-179).

3.6 It is not clear how the results reported informed the co-design phase if no results are provided on the needs of patients and clinicians.

Author Response: We feel the changes we made throughout the manuscript with regard to our objective/purpose and findings as well as changes we have made to the discussion and conclusion (lines 344-358, 407-413) have clarified how the results will inform future co-design work.

VERSION 2 – REVIEW

REVIEWER	Jenny Setchell
KEVIEWEK	The University of Queensland Australia
DEVIEW DETUBLIES	
REVIEW RETURNED	01-Oct-2018
GENERAL COMMENTS	The authors have done a wonderful job at responding to my
	comments. I have no additional comments.
REVIEWER	Dr Joanan Smith
	School of Healthcare University Of Leeds, UK
REVIEW RETURNED	12-Oct-2018
GENERAL COMMENTS	This is an interesting and highly relevant article and well written. The
	authors have addressed the suggestions on first submission, and
	the reporting of the study is much clearer. Thank you/
	The only suggestion is that the objective in the abstract could be
	clearer; To elicit family physicians and patients with knee
	osteoarthritis perceptions of its management and the potential use of
	mobile health applications to help self manage the condition.
REVIEWER	Enrica Papi
	Imperial College London
REVIEW RETURNED	23-Oct-2018
	20 000 2010
GENERAL COMMENTS	happy with authors responses.