Author’s response to reviews

Title: Socio-cultural contextual factors that contribute to the uptake of a mobile health intervention to enhance maternal health care in rural Senegal

Authors:
Margaret MacDonald (maggie@yorku.ca)
Gorgui Diallo (gdiallo@africare.org)

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Author’s response to reviews:

Dear BMC Reproductive Health Editors

Thank you for the opportunity to revise and resubmit this manuscript. Please find my point by point response to all 5 Reviewer reports below. My text is in blue. I write in the first person throughout but have shared and discussed my revisions with my co-author. In each instance I have provided the new page number and line number where the correction or additional text can be found. It is important to note that my detailed Response to Reviewers refers to page and line numbers on the clean copy of the revised manuscript. Please let me know if you have any questions or require any further clarification on any point.

Sincerely, Margaret MacDonald

Reviewer reports:

Reviewer #1: Good article, in general. Abstract: In the results section, while enumerating the five socio-cultural factors that work in concert to encourage the uptake and use of CommCare, the authors would consider using semicolons. The reader needs time to breath and internalise the points.

- I have done so.

Background Page4. In the first paragraph, while mentioning the potential of mHealth in improving maternal health especially in rural and remote areas of the country where people rely mostly on health posts for primary care, a mention on the mobile phone penetration and use would be key.
- I have added the following sentence to the second paragraph of the Background section: “It is worth noting that mobile phone penetration in Senegal, including rural areas, is high [9]; the vast majority of people either own or have access to a mobile phone and the wifi coverage is extensive. (See pg 3, line 39-41.)

Page5 line 56: I suggest substitution of "I conducted.." with "We conducted...", since there are two authors.

- I have altered this sentence to read: “To mitigate against this, three small focus groups were conducted for young married women only.” (See pg 11, line 16-17)

- I also added a sentence to the first paragraph under the Methods section that clarifies the roles of the two authors: “The first author conducted the interviews and ethnographic observation while the second author contributed to study design and analysis.” (See pg 5 line 16-19)

Methodology How participants in the various categories were selected for interviews needs elaboration, especially in the Care Group category where groups had varying numbers- 6 to 25 from the information provided.

- I have added a sentence to the second paragraph under Methods that reads: “Interviews were conducted over the course of a single day field visit to each community in order to capture as many of the desired participants as possible from the target categories. The range in the number of participants from Care Group to Care Group was due to differences in the population of communities and the availability of individuals on a given day.” (See pg 5, line 44-46)

The rest of the article is commendable and well done.

- Thank you. Reviewer #2: This is an interesting topic, and the manuscript would be of interest to many readers of this journal. However, a number of issues would need to be addressed before the manuscript could be considered suitable for publication in this journal or another outlet. There is a lack of clarity about methods, the results section lacks evidence in many places, and the material is not always appropriate for each section/heading. > ABSTRACT - The first sentence after the label "background" is not background

- I’ve corrected this. Please see edits to the Abstract.

- The first sentence after the label "methods" should specify what the study was conducted to do.

- This has been addressed by editing that sentence which now reads “An ethnographic study of the CommCare intervention and the larger maternal health program into which it fits was
conducted in order to identify key social and cultural contextual factors that contribute to the uptake and functioning of this mHealth intervention in Senegal.” (See pg 2 line 11-13)

The term "mHealth" should be defined the first time it is used.
- Corrected

> INTRODUCTION - References must be provided to support all claims (e.g., end of first paragraph of "Background", first sentence of second paragraph of "Background").
- I have added references to this section.

- In the second paragraph on p.4, can a URL (or other reference) be given for Africare?
- Yes. Done.

- Please provide English translations of all French terms - e.g., "Project Community Health, Collaborative Community Technology to Improve Maternal and Infant Health in Senegal (I think!) (p.4)
- This has been done.

- The description of CommCare is very informative. > METHODS - The claim the "ethnography produces robust and reliable knowledge" (p.5) needs to be justified. Surely there are certain procedures that must be followed to ensure that the research is rigorous, that interpretations are valid, and that the conclusions convincing and supported by evidence.

- Several reviewers posed similar questions about methods that gave me the opportunity to elaborate on what ethnographic methods entail and the value of the knowledge they produce to global health. I included references to several key sources. Please refer to the entire reworked Methods section starting on page 5.

- There is a surprising lack of clarity about hat was actually done during he course of the study: ... Who collected the data? There are two authors, but the singular pronoun "I" is used!

- I have clarified this with the addition of a sentence in the first paragraph of the Methods section which reads: “The first author, a trained medical anthropologist with extensive experience in qualitative methods, conducted the interviews and ethnographic observation while the second author contributed to study design and analysis.” (See pg 5 line 16-19)

... How were data collected?
I have added some detail to help answer this question: “The interview schedule for each category of participant was designed to elicit information, experiences and reflection on the design and functioning of the CommCare intervention in the community.” (See pg 5 line 23-25)

... What did the analysis actually entail? The paper only refers to "careful reading and re-reading" (p. 5)

- I have clarified this with the alteration of a sentence in the third paragraph of the Methods section and an additional sentence which together read: “Data analysis involved careful reading and coding of the transcripts and field notes to identify broad themes while applying interpretive anthropological analysis [21, 22, 23] informed by critical medical anthropology theory [24, 25] to generate nuance and insight related to those codes. In the analytical phases of the research, saturation was achieved as broad themes emerged from the coding process followed by deeper nuance and insights related to those codes. (See pg 6 line 7-12)

... What procedures were followed to ensure rigour? Was there any validation of the analysis?

- This question relates to others that have already been addressed. Please see changes to the entire Methods section and in particular the added sentences here: “Evidence in ethnographic research is not confined to data generated by interviews but also includes the observations of the researcher in the field. For example, I learned about Care Groups and the power dynamics within them not only from having them described to me in formal interviews, but by attending them. The total number of field visits and interviews ensured that data saturation – understood as a process, rather than a single point [18]– was achieved, ensuring the quality and reliability of the data.” (See 5 page 26-31).

- It is customary for study limitations to be addressed in the "Discussion" section, not the methods.- I have moved the Limitations to the Discussion section. It is now on page 11 lines 11-19.

> RESULTS - The results should not begin with a conclusion based on findings that are yet to be presented.

- This sentence introduces the reader to the results and describes the organisation of the sections that follow it. I therefore do not agree that it is out of place.

- Explain (in the methods) the letter-number codes that follow each quote.

- I have edited a sentence in Methods to explain: “A total of 62 interviews were conducted with participants drawn from four categories: Africare executive, technical and field staff, coded as
NGO (n=16); state trained health care providers including physicians, nurses, and midwives, coded as HCP (n=19); community level birth attendants, coded as MAT (n=14); and women belonging to a community intervention known as the Care Group coded as CG (n=13). (See page 5 line 36 - 40)

- It is very odd for some themes to be presented with absolutely no supporting evidence in the form of quotes.

- My response to this comment is that evidence in ethnographic research is not confined to data generated by interviews but also includes the observations of the researcher in the field. I added this sentence to the Methods section “Evidence in ethnographic research is not confined to data generated by interviews but also includes the observations of the researcher in the field. For example, the researchers learned about Care Groups and the power dynamics within them not only from having them described in formal interviews, but by attending them.” (See pg 5 line 26 – 29).

- To address this comment I have also added an interview quote to the Enabling Pregnancy Disclosure section that reads “Before the formation of the Care Group, to identify a pregnant woman was a real problem. A woman would hide her pregnancy. But when we put in place the Care Group, in effect, we put in place a method for detecting pregnancy. So, when you come to a meeting, there is a secret code that says, see, this woman is pregnant. And like that the Care Group members will know (CG11 2017).” (See pg 8 line 1-5)

- I have also added a sentence within the Enabling Pregnancy Disclosure section to make that clear that the data presented were from observation as well as interviews. “Interviews with Africare technical and field staff alerted me to this practice which was confirmed by field observations of Care Group meetings and the Care Group interviews,” (See page 7 line 44-46)

- Much of the paragraph after the first quote after the heading "Convening women ..." (p.6, lines 36-41) is a description of the programme: it is not a result of the study.

- Description of the programme is essential here and is part of the findings in that the purpose of the study was to identify key social and cultural contextual factors that contribute to the uptake of this mHealth intervention. The Care Group is not just background description but one of those factors that supports Commcare. I have made this point explicit by adding a sentence to the end of that section: “The Care Group facilitates the use of Commcare by providing the social platform and enabling structure for other things to happen that are key to the success of the intervention.” (See page 7 line 21-23).
The final sentence of the results section (p.10, lines 27-29) - with its use of the hackneyed terms "Global South" and "Global North" is not a presentation of results: if anywhere, it belongs in the discussion section.

- Point taken, I have removed these terms and refer only to low resource and high resource settings. I have moved the sentence to the Discussion. (See pg 11 line 6.)

> DISCUSSION  - It would be informative to include some discussion of how the data compared across the different group included in the study: was there systematic variation in the presence and importance of the different themes between the different groups?

- The 5 key themes presented in this paper are the most important across the groups of interview participants. We have not endeavoured to quantify them.

- References must be provided to support all claims (e.g., p.11, line 22)

- I have added references to support this statement. (See page 12 line 17)  > CONCLUSION - The second paragraph of this section is *not* a conclusion based on the study findings.

- I would like to leave this paragraph here as a way to close the paper and to let the reader know how this mHealth intervention and our study on it fit into larger conversations and policies at the national and global scientific level. I do not find it out of place.

> PRESENTATION  - The manuscript should be proofread to ensure that there are no errors in expression, and to ensure that everything is clear and reader-friendly.

- This has been done.

- Do not confuse "while" and "although": they are not direct synonyms.

- I have corrected such instances in the ms.

- All sentences should be complete sentences (i.e., usually containing a verb, a subject, and an object). So, "Context matters" (p.2, p.3) is not a complete sentence. However, if it were preceded by a colon it would be an appropriate clause of the preceding sentence.

- Corrected.

- All acronyms and abbreviations must be defined/explained that first time they are used. In addition, the list of abbreviation used must be checked for completion.

- I have done so.
Reviewer #3: This is an interesting and well written article which gives interesting insides. My main recommendation relates to the method section where I miss a few information:

why so many interviews?
- See question about quality below.

Was there any framework used to guide the development of the interviews?
- I have added a sentence in the methods section that reads; “The interview schedule for each category of participant was designed to elicit information, experiences and reflections on the design and functioning of the CommCare intervention in the community” (see pg 5 line 23-25)

How was quality ensured?
- My answer to this question and the question about the number of interviews is as follows: “The total number of field visits and interviews ensured that data saturation – understood as a process, rather than a single point [16] – was achieved, ensuring the quality and reliability of the data.” (see pg 5 line 29-31)
- Later I note “In the analytical phases of the research, saturation was also achieved as broad themes emerged from the coding process followed by deeper nuance and insights related to those codes.” (See page 6 line 10-12).

What was the education/training of those who did the interviews?
- This question has been addressed in a sentence added to the first paragraph of the Methods section: “The first author, a medical anthropologist with training and extensive experience in
qualitative methods, conducted the interviews and ethnographic observation while the second author contributed to study design and analysis.” See pg 5 line 16-19.

What method of analysis was used?

- I have edited an existing sentence in the Methods section to add detail on the analysis “Data analysis involved careful reading and coding of the transcripts and field notes to identify broad themes while applying interpretive anthropological analysis [21, 22, 23] informed by critical medical anthropology theory [24, 25] to generate nuance and insight related to those codes.” (See pg 6 line 7 – 12.)

I think the limitations of the study should go to the discussion.

- It has been moved. See pg 11 lines 11-19.

Reviewer #4: Review comments  In general, this is a very interesting paper. Overall the arguments are presented well, and the discussion goes to depth in addressing issues from a theoretical, policy and global knowledge context. A minor and more general comment is to request authors to insert references for certain statements throughout the paper. In addition, the almost neat presentation of the tool and how it works seems remarkable. Given particularly the authors argue that the technology is social, one might expect that there are also ways in which this technology disrupts in a more negative than positive sense. Were there not data to this effect? Perhaps it is a question of having included participants closely associated with the intervention, and not other external voices. The authors may wish to address this. And even though this is said at the end of the manuscript, in the associated information, I suggest specifying in the text who did the interviews and focus group discussions, and also whether this study was done in a distinct region, and where exactly in rural Senegal? Finally, I do agree in general with the way the author titled the paper, and how the arguments emerge. At the same time, in some instances I got the impression the paper is actually describing how the technology influences social relations, and the 5 themes that they take up would perhaps be the pathways through which this occurs. I am not attempting to flip the paper, but just presenting another way to look at it. And in the presentation of results, may the authors describe the characteristics of the people being quoted, to help read the quotes in context.
I’d like to address the comment as to whether the technology ‘disrupts’ and if so how. I have not used the term disrupt but rather ‘shifts’ and even ‘subtely shifts’, especially in the Results section on Harnessing the authority of older women and where I discuss the concept of authoritative knowledge in the Discussion section. Though ‘disruptive technology’ is a very current notion and useful for some settings, it is not what I see happening here. Rather as I describe shifts in health seeking practices and subtle shifts in authority for women collectively. As to the question of negative effects of the Commcare technology, there are some ways that the intervention is not working as well as it could be and I have addressed this in several ways:

- I mention on page 6 line 26-29 that access to electricity and to phone credit posed a logistical problem in the early days “Access to electricity, phone credit, and the wifi network in rural areas where the project runs is also essential and Africare is working on its own innovative solutions in those area -- including partnerships with telecom companies and providing solar energy charging stations -- but in this research we focus on the social and cultural elements of the assemblage which tend to be under studied in global health research.”

- In the Adding Value to Community Health Workers section, pg I quote a matrone who speaks directly to some of the challenges in her work, noting that it’s not perfect. See pg 10 line 17-24.

- I have added a sentence in the Results section at the end of the Adding Value Section: “A challenge with the task shifting to matrones is that they continue to be engaged as volunteers who are trained and logisitically supported, but not paid for their work. Most matrones are diligent and competent but we knew of several matrones who had ‘given up’ their involvement in the CCHT project because of the need to work at other things.” (See pg 10 line 41-43.)

- Adressing Reviewer 4’s questions about regions, I have added a sentence on pg 5 line 16 in the first paragraph of the Methods that reads: “We focussed on three regions: Tambacounda, Zinguichor and Sedhiou.” Other questions in this section have already been addressed.

Below are more specific comments: Page 2, Line 57/58: Authors say "in this study we focus on...", then they list the 5 themes. I would propose rephrasing to indicate rather this is what the paper is addressing being themes that emerged in this study. To say outright that the study focuses on the themes gives the impression these may have been preconceived, and authors were interested in these themes when they carried out the study; I presume this not necessarily what the authors with to convey

- I have altered that sentence to read: “In this study we sought to explore the socio-cultural factors that contributed to the uptake of CommCare and identified five key interconnected socio-cultural elements.” (See pg 3 line 1-3)
Page 3. Line 25/26: I suggest moving text in parenthesis to between "causes" and "account"

- Done. (See pg 3 line 20-22.)

Page 3; Line 29, I suggest a reference after "anemia"

- Two references are now in that place. (See pg 3 line 23.)

Page 3, Line 41: Do the authors mean the mHealth technologies are emerging as part of the approach for MoHSA or rather more generally?

- I’ve edited two sentences there to clarify: “The reduction of maternal mortality is a priority of Senegal’s Ministry of Health and Social Action (MOHSA) and mobile health (mHealth) technologies are emerging as part of the national approach [7]. Indeed, mHealth interventions such as rapid diagnostic tests, cell phone apps, and telemedicine, are changing the reality of health care delivery in low resource settings around the world [8].” (See pg 3 line 33 and then 39.)

Page 4, line 46: is "accompanying her to appointments' a virtual act done via phone or it is done physically?

- I mean in person. See minor edit to that sentence now on pg 4 line 43.

Page 5: Line 24-26 ("While…… health"), please re-check grammar to make more intelligible

- Sentence has been re-written: “While generated at the level of the particular, knowledge produced by ethnographic methods can provide insights that contribute to our understanding of mHealth interventions in global health.” (See pg 5 line 33-35.)

Page 5, paragraph line 27 - 36, It is not clear that FGDs were done; rather these seem to be reported as interviews. I think a clear distinction needs to be made in the paragraph, I suggest reviewing it. Also FGDs are often held in local language, did the issue of translation affect their progress and analysis in any way?

- I have made changes throughout the article to be clear that I mean Care Group meetings not focus groups, except in the case of three focus groups that were sub-groups of Care Groups mentioned. I do note that “All Care Group and Community Health Workers meetings took place with aid of translators. Individual meetings with Africare staff and formal health care providers took place in French with the first author alone.” (See pg 5 line 43-44)

- I note in my limitations paragraph in the Discussion section that the need to rely on translators may have affected the nuance with which verbal exchanged were understood in the moment, but I was able to read transcripts later
Page 5, line 50-58: The authors' use of multiple methods should have resulted in what is often termed triangulation, which would also help to check and confirm or dispute findings across methods and techniques. Would the authors consider bringing in the concept of triangulation in their presentation of methods and discussion of study limitations?

- Ethnographic methods do something similar to triangulation in terms of confirming findings across participant groups and methods. The changes I have made to the Methods section in response to several reviewer requests for more information about methods and the process of interpreting the data collected address this reviewers suggestion for further explanation.

Page 5, line 56: "a small number" - please indicate how many?

- Three small focus groups. (See pg 11 line 16)

Line 9/10: "potential power technology" - in what sense is the technology considered potentially powerful

- On page 4 lines 40-47 and pg 5 lines 1-6 I have described the many functions of the device as a medical file, public health tool, referral mechanism and also noted the data it generates about antenatal attendance, place of birth etc. This is what I mean by a powerful technology. I have deleted the word ‘potential’ on pg 6 line 18.

Page 6, line 11-12: if it actors are brought together spontaneously, I would consider that this spontaneity is not serving a goal because there is spontaneity. I will ask the authors to consider re-looking.

- This comment does not seem essential to address.

Page 7, line 38-39: I am wondering if there is a suggestion that care groups, which are clearly a non-traditional (perhaps modern) structure 'protect' against the wider community, which would include on the whole people not connected to Care groups? In other words, the wider community seems to be considered harmful and threatening of the positives of the Care groups.

- I state on pg 6 line 43-44 line that the Care Group intervention draws on the tradition of women’s associations in Senegalese society and has therefore been well received. I do not agree that my description or analysis leaves the impression that the wider community is a threat to Care Groups. I have added a sentence to make this clear; ‘Care groups are accepted in the communities. Village chiefs, to whom we made a courtesy visit before beginning our research for the day, were generally very supportive of the intervention because they supported the goal of improving women’s health and noted the practical value of women saving money collectively for health care.” (See pg 7 line 18-23).
Page 8, line 48-50; May the authors please rephrase, the line is not easy to follow,

- Sentence has been re-phrased to read: “(Nor is reproduction a solo endeavour in the West, but this characterization of women embedded in the power of the family tends to be exaggerated for women in the global south). (See pg 9 line 17-19)

Similar for Page 8, line 55-57.

- Some small edits I hope have made this sentence clearer: “The collective authority of the Care Group does not preclude the expression of individual ‘rights’ or empowerment – concepts at the centre of global health ‘reproductive and sexual health and rights’ frameworks -- but it does not demand it”. (See pg 9 line 23-27)

Page 9, line 13-17: Misinformation is listed as a source of authority that hampers health? Do the authors intend to convey this?

- To some degree, yes. For example, the idea that women must not consume red meat during pregnancy or they will bleed profusely in childbirth. This idea holds some sway in some communities. I specifically chose the word misinformation rather than superstition or cultural belief.

Page 9, 33-35, the matrone is described as somewhat superior to the traditional birth attendant of the past. I will just urge authors to approach this with a measure of caution, particularly if there is no critical review of the role and function of the traditional birth attendant of the past to accompany this observation. The conflict between change and tradition is a source of huge debate.

- I have deleted the problematic sentence and repaced with one containing references to relevant literature. “The value of training of traditional birth attendants to contribute to maternal health has been a matter of significant scientific debate. Training programs have been criticised for their brevity, poor quality, lack of follow-up, failure to account for cultural context, and lack of integration with the formal health care system [30, 31,32,33,34]. Training programs for matrones in Senegal seek to avoid some of these pitfalls.” (See pg 10 line 4-8).

Related to the above, page 10 line 25 refers to western biomedical systems, appearing to position these as a benchmark from which to assess 'other' systems. This seems to go against the manner in which ethnography and qualitative research methods seek to generate contextualized understandings.

- This was not the intention of the statement nor do I think it reads that way. I would like to leave it as is.
Reviewer #5: I enjoyed this manuscript. However, in its present form there are errors in English grammar and syntax; although understandable, these errors serve to detract from the quality of the work. The author should seek assistance from an experienced editor. As the study is focus on the context in rural Senegal, why do the author need to publish this in international journal?

- The answer to this question may be found within the manuscript in the final paragraph in the Conclusion where I state that the findings from this study are not limited in relevance to Senegal nor to maternal health interventions. Earlier in the paper, it is noted that: “While generated at the level of the particular, ethnographic methods can provide insights that contribute more broadly to thinking about mHealth interventions in global health.” (See pg 5 line 33-35).

- The answer to this question may also be found in the mission of this international journal and many others, to publish articles from/about the global south for the purposes of broad knowledge dissemination.

There are a lot of texts that needs citation. For example: Page 3, line 26-29 needs citation.

- A reference has been added. [4]

Page 4 line 18: "founding". Do the author mean foundation?

- No we do not. Have left text as is.