## PEER REVIEW HISTORY



## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Sociodemographic and health-related determinants for making repeated calls to a medical helpline: a prospective cohort study |
| **AUTHORS** | Blakoe, Mitti; Gamst-Jensen, Hejdi; von Euler-Chelpin, My; Collatz Christensen, Helle; Møller, Tom |

## VERSION 1 - REVIEW

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| **REVIEWER** | Stefanie Lopriore<br>The University of Adelaide, Australia. |
| **REVIEW RETURNED** | 12-Mar-2019 |

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| **GENERAL COMMENTS** | Thank you for this interesting paper looking at a rather intriguing topic – that of repeat caller characteristic. I believe that the basis of the paper is sound and offers useful insights, but that the manuscript as it stands requires a bit of work to be at publication standard.<br><br>My main concern pertains to the 'finding' that repeated calls may be caused by "hampered co-construction", as I do not believe that the design of this study allows the authors the ability to draw such conclusions. The research would need to explore the actual interaction of calls in order to see whether such difficulty is actually occurring (e.g., using Conversation Analysis or other qualitative approaches). Given that the authors did not use such an approach and are relying on quantitative methods, such statements about communicative issues cannot be made. The study design only provides information about the characteristics associated with repeat callers – nothing more. I would be happy to see some comments about possible interactional difficulties as a general section in the Discussion as I do believe that it is possible this is occurring (perhaps even as a suggestion for future research), but it should not appear as a main finding - it is merely speculation at this stage. The same applies to the comment regarding telephone triage "unintentionally mediating inequities in access to acute healthcare services". Given that the authors have made these statements rather focal (i.e., they are found in multiple sections), the manuscript will need to be reworked in several areas to remedy this.<br><br>Please note that some of the suggested revisions below may apply to multiple sections of the manuscript (e.g., spelling/ grammar errors). As such, please ensure that you check spelling/ grammar throughout the manuscript for the issues highlighted below. |

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| | Title:<br>- The grammar of the current title looks odd to me and it is somewhat wordy. Consider changing to the following: "Sociodemographic and health-related determinants for performing repeated calls to a medical helpline: A prospective cohort study."<br><br>Abstract:<br>- I didn't find the Objectives section very informative. It currently seems to explain the findings, rather than the aims of the investigation. The Aims section covers this much more succinctly. My suggestions would be to re-label the Aims section as "Objectives", and delete the content that is currently in the Objectives section.<br>- The phrase "Capital Region" does not require capitalisation.<br>- The phrase "Medical Helpline" does not require capitalisation, nor does the word "Helpline" unless at the beginning of a sentence.<br>- The wording in the Participants section regarding exclusion criteria needs to be rewritten as it does not flow.<br>- Your conclusion section needs to be reworked, bearing in mind my above feedback regarding hampered co-constructions. The conclusions section should describe the key findings regarding the sociodemographic and health-related characteristics associated with repeated calls. It would enhance readability if the authors could be more explicit regarding which characteristics were associated with repeated calls (e.g., income, immigration status, etc.).<br>- Again, the sentence "Consequently, telephone triage might unintentionally mediate inequities in access to acute healthcare services…" needs to be reconsidered given my feedback on the study's ability to comment on co-constructions.<br><br>Strengths and Limitations:<br>- This section includes multiple grammatical errors. I will highlight some of them, but I strongly encourage the authors to proofread the manuscript thoroughly before resubmission.<br>- No need for a comma in bullet point 1.<br>- No hyphenation required between the words "related" and "and" in bullet point 2 -> however, hyphenation is required for the phrase "health-related".<br><br>Introduction:<br>- The introduction provides a very brief overview regarding the function of telephone triage in Denmark, and the difficulty that callers can face when using such a service. This section could be strengthened by literature on the relationship between sociodemographic/ health-related factors and help-seeking. I would assume that there is a substantial body of literature discussing how certain populations (e.g., immigrants, low SES) have greater healthcare needs and (therefore) greater primary care presentations. This would be a meaningful prelude into the current study on repeat callers.<br>- In this sentence: "Triage outcome can be one of two superior outcomes…", the word "superior" seems odd. My suggestion is to omit it.<br>- Please check your spelling of the word "advice" throughout, as the word "advise" is often used incorrectly. For example: "…or 2): medical telephone advise (advice on selfcare, advised to see their usual general practitioner, or medical prescriptions)"<br>- In this sentence: "…clinical decision making is compromised by the lack of visual clues", the word "clues" should be changed to "cues". |

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| | Method:<br>- It would be useful to know more information about how the survey was completed. For example, did callers provide verbal responses or make a selection from their phone keypad?<br><br>Discussion:<br>- 'Implications for clinicians and policymakers' section will need to be reworked, as it currently focuses on implications regarding "hampered co-constructions". Instead, the authors could discuss how this study highlights an association between certain patient characteristics and repeated calls, which implies that such patients may have different health service needs than single call patients. Future research investigating interactional difficulties in repeat calls (such as hampered co-constructions) could be proposed here.<br><br>Conclusion:<br>- Again, need to rework and focus on the actual findings of the study. What are the implications of knowing that patients with certain sociodemographic and health-related characteristics may need to make repeat calls? What does this mean for health services or clinicians?<br><br>I recognise that my suggestions may appear onerous at first glance, but believe that the paper will be fundamentally strengthened if taken on board. I look forward to the revision of this interesting paper. |

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| **REVIEWER** | Tim Holt<br>Oxford University |
| **REVIEW RETURNED** | 26-Mar-2019 |

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| **GENERAL COMMENTS** | This paper discusses an interesting question, over the source of unsatisfactory and ineffective triage consultations that lead to a second encounter within 48 hours. The authors hypothesise that the source includes 'hampered co-construction in the initial call' and seek to investigate this through a survey of the callers, 4% of whom needed to call in a second time. The authors do not justify this assumption sufficiently. Surely we expect a certain number of callers to call back, for instance if the initial advice has required review and reassessment in the case of a febrile patient? What percentage would we expect if the initial consultations were of high quality?<br>And surely if the issue is communication, the characteristics of the triage clinicians is also important? Could these ineffective consultations not occur as a result of language barriers due to the clinician not speaking the same first language as the caller? This might be a factor equally important as the caller-specific factors identified in the study, but this possibility is not discussed. Other clinician-specific factors might also contribute, and could have been included in a wider survey.<br>I also thought that the 'degree of worry' needed a clearer definition, as I believe it is a measure developed by this research team, in this specific setting. The study is embedded within a wider trial (registered at clinicaltrials.org), and the relationship between this study and the wider trial could also be clarified.<br>The standard of English is generally good but would require some minor corrections. |

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| **REVIEWER** | Sheyu Li<br>West China Hospital, Sichuan University |
| **REVIEW RETURNED** | 22-Apr-2019 |

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| **GENERAL COMMENTS** | The study design and statistical analyses of the paper are generally well organized. But I would suggest that this is a case-control analysis based on a cross-sectional study rather a prospective cohort study.<br><br>Other methodological concerns:<br>1. How did the authors for the missing value in the analysis? In SAS, cases with the missing values (in outcome or factors) are automatically omitted. It is reported that there were 108 cases with missing SRH, which was included as the factor in the mutually adjusted OR. Because it is very limited in number, I would suggest to exclude them in all analyses (simpler way) or use some imputation method to fill them.<br>2. Although more than 11 thousand patients were included, the case group (repeated callers) has only 464 samples, which is relatively limited regarding the number of adjusted factors in the mutually adjusted model (9 factors with df = 19). There is thus a risk of over adjustment. I would suggest the authors drop some of the unnecessary factors and reduce the df is possible (eg. CCI can be classified as 0 or >=1, including age as a continuous variable in the multivariate model).<br>3. It is better to describe the multivariate model more clearly. As there is adjusted and mutually adjusted OR for age and gender, it is not suitable or possible to adjust for age in the analysis of age as the outcome. Similar issues need to be noted in other factors in the fully adjusted model.<br>4. As not all the readers are familiar with the Danish system, the definition of some of the factors need to be more clearly stated. For example, what do low, middle and high DOWs mean? Were they self-rated or evaluated by professionals?<br>5. Please make sure that there is no collinearity across the factors in the mutually adjusted model. Tests like VIF may be necessary.<br>6. Descriptive method of age was not described in the Method section.<br><br>Please mind the typos in the manuscript - there are many. |

## VERSION 1 – AUTHOR RESPONSE

Reviewer: 1, Stefanie Lopriore

Dear Dr Lopriore

Thank you for your constructive review and suggestions for clarification and revision. Below, we clarify what we did to incorporate your review comments and address each issue separately.

My main concern pertains to the ‘finding’ that repeated calls may be caused by “hampered co-construction”, as I do not believe that the design of this study allows the authors the ability to draw such conclusions.

We fully agree with your concern and have removed this as a finding. We believe that repeated calls might be a result of hampered co-construction at the initial call, a supposition we support in the Introduction and in the Discussion section as follows:

Specific clinical factors, such as the call handlers’ level of professional experience or language barriers may also have affected the individual’s need to call more than once. Identification of these factors is beyond the scope of this survey but a relevant issue to explore in future studies.

I would be happy to see some comments about possible interactional difficulties as a general section in the Discussion as I do believe that it is possible this is occurring, but it should not appear as a main finding.

Comments and reflections on possible interactional difficulties are now provided in the Discussion section, as follows:

Because one of the aims of this study was to be able to implement results in decision making in clinical practice, the sociodemographic and health-related characteristics variables were not tested for interaction. Nevertheless, the existing evidence on the sociodemographic and health-related characteristics of interest suggest multiple interactions between variables, eg a poor SRH interacts with age and with comorbidities;(50) a higher DOW interacts with female callers;(23) and immigrant status interacts with a lower self-perceived health and a higher rate of comorbidities.(51) Testing for interaction in the statistical analysis could potentially have provided valuable insight into possible confounders but was considered outside the scope of this study.

…the comment regarding telephone triage “unintentionally mediating inequities in access to acute healthcare services”. Given that the authors have made these statements rather focal (i.e., they are found in multiple sections), the manuscript will need to be reworked in several areas to remedy this.

We have generally removed this assumption in the manuscript, but because we believe that this is an important consideration, we raised this issue in the “Implications for clinicians and policymakers” section to increase awareness of it:

Our results highlight the relevance of being aware of the risk that telephone-based preadmission evaluations may unintentionally worsen inequities in access to healthcare services and increase the health inequities that exist in the general population.

…lease ensure that you check spelling/ grammar throughout the manuscript for the issues highlighted below.

Thank you for your feedback. The grammar errors have been corrected throughout the manuscript.

Title: Consider changing to the following: “Sociodemographic and health-related determinants for performing repeated calls to a medical helpline: A prospective cohort study.”

Thank you for your suggestion to improve the title, which we have adjusted.

Abstract: My suggestions would be to re-label the Aims section as “Objectives”, and delete the content that is currently in the Objectives section.

We have deleted the aim section and changed the description under Objectives in the abstract, which now states:

Objectives. To identify sociodemographic and health-related characteristics of individuals making repeated calls within 48 hours to a medical helpline, compared to those who only call once.

The wording in the Participants section regarding exclusion criteria needs to be rewritten as it does not flow.

Thank you, the wording in the Participant section has been rewritten to make it more readable.

Your conclusion section needs to be reworked, bearing in mind my above feedback regarding hampered co-constructions. The conclusions section should describe the key findings regarding the sociodemographic and health-related characteristics associated with repeated calls. It would enhance readability if the authors could be more explicit regarding which characteristics were associated with repeated calls (e.g., income, immigration status, etc.).

We have rewritten the conclusion, clarifying it with an explicit description of the main findings on the association between sociodemographic and health-related characteristics and making repeated calls to the telephone triage.

the sentence “Consequently, telephone triage might unintentionally mediate inequities in access to acute healthcare services…” needs to be reconsidered given my feedback on the study’s ability to comment on co-constructions.

As described above we chose to keep this sentence in modified form in the section “Implications for clinicians and policymakers” because we believe it is a highly relevant consideration.

Strengths and Limitations: This section includes multiple grammatical errors.

Thank you for your feedback. The grammar errors have been corrected throughout the manuscript.

Introduction: This section could be strengthened by literature on the relationship between sociodemographic/ health-related factors and help-seeking.

We fully agree with your suggestion. This section now contains literature describing sociodemographic and health-related characteristics for people with repeated encounters with healthcare services. We hope that it now more clearly describes the existing knowledge in this area.

In this sentence: “Triage outcome can be one of two superior outcomes…”, the word “superior” seems odd.

We have removed the word “superior”.

Method: It would be useful to know more information about how the survey was completed. For example, did callers provide verbal responses or make a selection from their phone keypad?

The Methods section now contains a more exact description of the data collection method:

Prior to speaking with the call handler, caller responses to three survey questions were collected: self-evaluated DOW (1=low, 2=middle, 3=high) and SRH (on a scale of 1 to 5, where 1=very good and 5= very poor) and who the caller was (patient, close relative to the patient, other). A recorded message presented the survey questions, which callers responded to on a numeric scale using their phone keypad.

Discussion: ‘Implications for clinicians and policymakers’ section will need to be reworked, as it currently focuses on implications regarding “hampered co-constructions”. Instead, the authors could discuss how this study highlights an association between certain patient characteristics and repeated calls. Future research investigating interactional difficulties in repeat calls (such as hampered co-constructions) could be proposed here.

We reworked the Discussion section, changing the focus from potential hampered co-constructions to the awareness that a medical helpline might unintentionally mediate inequality in access to OOH healthcare services, as described elsewhere.

Reviewer 2, Tim Holt

Dear Dr Holt

Thank you for your constructive review and suggestions for clarification and revision. Below, we clarify what we did to incorporate your review comments and address each issue separately.

The authors hypothesize that the source includes 'hampered co-construction in the initial call' and seek to investigate this through a survey of the callers, 4% of whom needed to call in a second time. The authors do not justify this assumption sufficiently…..

We have generally removed this assumption in the document but, as we believe that this an important consideration, we raised the issue in the Discussion section and noted that repeated calls may also be mediated by specific clinical factors:

Specific clinical factors, such as the call handlers’ level of professional experience or language barriers may also have affected the individual’s need to call more than once. Identification of these factors is beyond the scope of this survey but a relevant issue to explore in future studies.

I also thought that the 'degree of worry' needed a clearer definition, as I believe it is a measure developed by this research team, in this specific setting.

We fully agree with your suggestion and now more clearly defined the “degree of worry” variable in the Methods section under e “Exposures” on page 7. We hope that this is a satisfactory description.

DOW represents a self-evaluated measure of the caller’s level of worry concerning the acuteness of their health situation. Although this scale has not been validated a previous study showed that people using OOH services were able to rate their DOW as a measure of the self-evaluated level of urgency at MH1813. (23, 24)

The study is embedded within a wider trial (registered at clinicaltrials.org), and the relationship between this study and the wider trial could also be clarified.

The relationship between this study and the wider trial has been clarified in the Setting section on page 5:

The present study is embedded within a wider trial that investigates Degree of Worry (DOW) as a predictor for the use of acute health care services. This study is registered at www.clinicaltrials.gov (NCT02979457).

The standard of English require some minor corrections.

Thank you for your feedback. The grammar errors have been corrected throughout the manuscript.

Reviewer: 3, Sheyu Li

Dear Dr Li

Thank you for your constructive review and suggestions for clarification and revision. Below, we clarify what we did to incorporate your review comments and address each issue separately.

I would suggest that this is a case-control analysis based on a cross-sectional study rather a prospective cohort study.

Thank you for your suggestion, which we have considered but prefer to maintain that this is a prospective cohort study because callers were followed from the exposure to data collection (ie the self-evaluated data in relation to degree of worry and self-rated health) until outcome (one-time caller/repeat callers), ie exposure prior to outcome.

Other methodological concerns:

1. How did the authors for the missing value in the analysis?

We removed the missing values in the tables and described how we handled the missing values in the Analysis section:

Due to the limited number of missing values in the data collection (n=106 in SRH), they were excluded from the analysis because their absence was considered random.

2. Although more than 11 thousand patients were included, the case group (repeated callers) has only 464 samples, which is relatively limited regarding the number of adjusted factors in the mutually adjusted model (9 factors with df = 19). There is thus a risk of over adjustment. I would suggest the authors drop some of the unnecessary factors and reduce the df is possible (eg. CCI can be classified as 0 or >=1, including age as a continuous variable in the multivariate model).

We agree that over adjustment is a possibility, but also believe that it will most likely only affect precision and not lead to over adjustment bias; hence, we maintain that the adjustment is sound. We hope that this is acceptable to the reviewer.

3. It is better to describe the multivariate model more clearly. As there is adjusted and mutually adjusted OR for age and gender, it is not suitable or possible to adjust for age in the analysis of age as the outcome. Similar issues need to be noted in other factors in the fully adjusted model.

Tables 1-3 indicate that, in the full model, the results are mutually adjusted, ie for all factors but the one in question. This study does not include an analysis on age as an outcome.

4. As not all the readers are familiar with the Danish system, the definition of some of the factors need to be more clearly stated. For example, what do low, middle and high DOWs mean? Were they self-rated or evaluated by professionals?

We clarified the factors in the Exposures section and the data collection method for these factors by adding the following:

Prior to speaking with the call handler, caller responses to three survey questions were collected: self-evaluated DOW (1=low, 2=middle, 3=high) and SRH (on a scale of 1 to 5, where 1=very good and 5= very poor) and who the caller was (patient, close relative to the patient, other). A recorded message presented the survey questions, which callers responded to on a numeric scale using their phone keypad.

DOW represents a self-evaluated measure of the caller's level of worry concerning the acuteness of their health situation. Although this scale has not been validated a previous study showed that people using OOH services were able to rate their DOW as a measure of the self-evaluated level of urgency at MH1813.(23, 24)

SRH reflects an individual's own assessment of their health according to their own definition of health. SRH is a validated scale that predicts morbidity and mortality,(25) and also prompts people to seek primary care more frequently.(20, 26)

5. Please make sure that there is no collinearity across the factors in the mutually adjusted model. Tests like VIF may be necessary.

We agree that some degree of collinearity, or a strong correlation between two predictor factors, is possible, but the strength of prediction and factor independence is beyond the scope of this study, thus also the use of VIF. We hope that this is acceptable to the reviewer.

6. Descriptive method of age was not described in the Method section.

The descriptive method for age has been added:

age (≤ 5 years, 6 -18 years, 19 -65 years, > 65 years) were retrieved from the electronic patient record at the MH1813. This methodical classification of age was chosen on the basis of characteristic disease patterns in the respective age groups (child, adolescent, adults and elderly).

Please mind the typos in the manuscript - there are many.

Thank you for your feedback. The grammar errors and typos have been corrected throughout the manuscript.

**VERSION 2 – REVIEW**

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| **REVIEWER** | Stefanie Lopriore<br>University of Adelaide, Australia. |
| **REVIEW RETURNED** | 31-May-2019 |

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| **GENERAL COMMENTS** | Thank you for submitting a revision of this interesting paper. The paper has improved considerably, and I am glad to see that you have accepted much of the valuable feedback from other reviewers. My feedback is generally minor, but requires some further thinking about how you communicate the contributions of this study.<br><br>On page 5, you state why identifying sociodemographic and health-related determinants for repeated calls is important to investigate. While it may prevent clinical errors and help with triage, I would think a larger contribution is that you are providing insight on a caller group that is rather misunderstood, and who use a lot of helpline resources through their repeated calls. Understanding the characteristics of this caller group may help policymakers determine why they are making repeated calls, and therefore work towards a solution so it doesn't continue to occur.<br><br>I am still not sure that I agree with all of the statements in your Discussion section in the "Implications for clinicians and policymakers" paragraph. What your study shows is that low income earners and immigrants made repeated calls. However, you did not look at the reasons for why these repeated calls were made. Due to this, I don't think you can make the statement that the telephone-based preadmission evaluation may worsen inequality to healthcare - this statement implies that the helpline system itself is the cause for the repeat calls. While this could be the case (e.g., if there are language barriers, etc), your study does not investigate this. It could also be argued that this group make repeated calls because, generally, they have much higher prevalence of sickness and injury. My suggestion is to focus on the implications of your actual findings, and how they may be used to guide future research. |

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| **REVIEWER** | Tim Holt<br>Oxford University, UK |
| **REVIEW RETURNED** | 12-Jun-2019 |

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| **GENERAL COMMENTS** | I appreciate the efforts made to meet my concerns and am generally happy with the revisions. It could still be the case that a small number of individual call handlers have Danish that is so poor that the majority of callers simply can't understand and have to ring back. |

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| | The design of this study (in which call handler characteristics are not collected) can not rule this out, and so is limited as a study of 'co-construction' in the initial call. But I see that the term 'hampered co-construction' has been removed, which is a good thing as the study is not designed to investigate the interaction, only the caller characteristics. |

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| **REVIEWER** | Sheyu Li<br>West China Hospital, Sichuan University |
| **REVIEW RETURNED** | 22-May-2019 |

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| **GENERAL COMMENTS** | Thanks for the careful response by the authors as well as the valuable comments from other reviewers. I have no more comments or advice with the current study. |

**VERSION 2 – AUTHOR RESPONSE**

Reviewer Name: Stefanie Lopriore

Institution and Country: University of Adelaide, Australia.

Thank you for your review and your suggestion to improve our communication of the contributions of this study.

On page 5 we have stated more clearly how this study is contributing to insight on citizens performing repeated calls to a medical helpline my adding the following:

“In addition, by gaining insight on underlying determinants to perform repeated calls, policymakers might be provided with knowledge that potentially help prevent the portion of repeated calls that may be unnecessary and resource demanding.”

In the discussion section we have removed the sentence:

“Our results highlight the relevance of being aware of the risk that telephone-based preadmission evaluations may unintentionally worsen inequities in access to healthcare services and increase the health inequities that exist in the general population.“

The remaining discussion section is preserved as we believe that this focus on the implications of our findings, and how they may be used to guide future research.

Reviewer: 2

Reviewer Name: Tim Holt

Institution and Country: Oxford University, UK

Thank you for your review and your comments on our reviewed manuscript. We agree that it was appropriate to remove the term hampered co-construction as the focus on this study is the caller characteristics.

In the Implications for clinicians and policymakers section we have added the following sentence:

“The aim and design of this study provides knowledge on callers´ determinants for performing repeated calls. However, the study does not provide knowledge on potential determinants related to the call handler, nor the interaction between caller and call-handler during the initial call, which could be relevant to investigate in future research.”

Reviewer: 3

Reviewer Name: Sheyu Li

Institution and Country: West China Hospital, Sichuan University

Thank you for your review, we appreciate your recommendation for publication.