Author’s response to reviews

Title: Medication errors in primary health care records. A cross-sectional study in southern Sweden

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Author’s response to reviews:

We are grateful to the reviewers for their time reviewing our manuscript and we have carried out their suggestions in order to make the manuscript stronger. Please see below our responses to all queries.

Enas Almanasreh (Reviewer 1):

The manuscript addresses an important issue in the primary health care settings which is the medication errors that occur at transitions of care. However, to enhance the understanding of the components of the intervention used in this study, I suggest providing an operational definition for the medication reconciliation process and medication errors/medication discrepancies based on the context of this study since an important element, the best possible medication list, of this process was missing and using the patient safety terminologies was unclear. I think adding these definitions to the method part will improve the clarity and usability of this study.

Answer: The definitions of medication error, medication discrepancy (according to Aronson as well as Akram et al and Cornish et al) and of medication reconciliation/the best possible medication list (according to Institution for Healthcare Improvement) are presented in the background, and additionally in the method part when describing the procedure (p5), in order to improve the clarity. However, the data collection for this study did not fully correspond to the definition of medication reconciliation, as pointed out below.

The English language needs to be revised.
Answer: A native speaker with experience in the research field has edited the language in the manuscript.

I suggest changing the title and removing the statement “a common problem”.

Answer: The title has now been revised in-line with the suggestion.

The introduction (line 2-11), this paragraph is disjointed and needs further rearrangements.

Answer: A couple of sentences have been removed in order to make the rest of the paragraph more continuous and also to remove the focus on elderly.

The used medication safety terms like DRPs, medication errors, and medication discrepancies require more clarifications since they were used interchangeably. So, use them in a consistent manner throughout the manuscript. I suggest focusing on the medication discrepancy since it is the main outcome of this study.

Answer: We agree that the terms must be used in a consistent manner. The term DRP (drug-related problems) is used for the consequences that may arise from MEs, but this term is not used to present the results of the study. Frequencies and types of medication errors are the main outcomes and we have chosen to use this term when we are presenting and discussing the results of the study, according to the definition by Aronson. The term medication discrepancy (MD) was used confusingly a couple of times in the discussion and has now been changed into medication error. In the background, MD is used when in accordance with the studies cited.

I am wondering why you have focused on elderly patients in the introduction part since they were not a part of the inclusion criteria. This could confuse the reader.

Answer: Thank you for pointing this out. Elderly patients are more vulnerable to be exposed to drug-related problems; that is why the introduction was focused on them. However, as you state, the inclusion criteria for the study were patients aged 18 years and above. The focus on the elderly in the introduction has therefore been toned down.

Regarding the procedure, I found the approach used in conducting the medication reconciliation process does not match with the definition used in the introduction (line 28). For example, the study assumes that the patient’s actual medication list is a gold standard list and a comprehensive
approach to gathering the best possible medication list (BPML) using different sources of information has not been undertaken. Therefore, this point should be discussed in the discussion part and added to the limitations.

Answer: The study assumes that the patient’s actual use is “gold standard” since it the only true fact about what medications that actually reach the patient’s body. Other information sources are of less value if the patient, after all, does not follow these lists. Therefore, the procedure in this study did not include collecting medication lists from other caregivers. The procedure used in the study is designed for collecting study data, and is therefore not the same medication reconciliation process that is suggested to be incorporated into clinical practice. The study was not primarily designed to assess how well the patients adhered to their prescriptions from other caregivers. We have revised the method part (procedure) to clarify this and added this point to the limitations.

The BPML is an essential element of the medication reconciliation process. Therefore, I believe that the aim of this study is more related to determine the accuracy of the EMR rather than conducting medication reconciliation. To avoid any confusion, I would suggest adding a clear operational definition of the medication reconciliation process to describe the process based on the context of this study. This can be added to the method part (procedure).

Answer: We agree (see answer above) and this is implied in the Aims. We have revised the method part (procedure) to clarify this.

Page 5 (line 3-7), I am wondering about the differences between medication errors and medication discrepancies. In other words, why did you consider “Incorrect timing” as discrepancies but not errors?. I think errors of omission, different dosage, addition,…etc are medication discrepancies. To avoid confusion, please provide operational definitions for both medication errors and medication discrepancies based on the context of this study.

Answer: As stated in the introduction, the definition medication discrepancy was used as a broader term and includes medication error. We have now clarified this in page 5.

Page 5 (statistics): “The chi 2-test and the Mann Whitney U-test were used for comparisons”. It would be more informative if you mentioned the groups which were involved in the comparison.

Answer: The sentence has been revised in-line with the suggestion.
Conclusion: I suggest replacing the result statement “Five out of six medication lists used by the general practitioners…” by a general statement or you may use a percentage.

Answer: This statement has now been revised in-line with the suggestion.

Daniel Coletti (Reviewer 2):

Data in this report describe an investigation in which a researcher conducted medication review over the telephone with a sample of 56 patients who had been seen two weeks previously by a primary care provider. Patient report of their personal medication regimen was compared to the medication list in the EMR; there was only 16% concordance between patient lists and the EMR. The majority of patients had more than one discrepancy, patients who had seen other providers had significantly more discrepancies, and analgesics and cardiovascular drugs were most commonly identified as discrepant.

Examining the complexities involved in maintaining an updated medical record is an important healthcare issue and area of inquiry. The strategy of contacting a patient shortly after a primary care appointment to assess the accuracy of their medication list is interesting. The study has limitations that are outlined in part by the authors in their discussion. I have some additional questions about the procedures for conducting the medication review as well as assumptions made about patients' reports.

I think it's important for the authors to describe more about the structured process by which the patients were asked about their medications—for example, were the patients asked to provide unaided recall of what they remembered to be their active medicines, were they asked to review a written list provided to them at the previous primary care appointment, were they asked to gather their medication bottles and review each one, or was another prompting strategy used?

Answer: The structured procedure is described in Appendix 1, which is now attached.

Does the investigator have knowledge of whether medication reconciliation was attempted/conducted at the index primary care visit? Interpretation of results, including the reasons for the discrepancies, seems to depend on whether there was patient-provider agreement on the medication regimen at the time of the visit and then was subsequently changed by the patient in the two weeks after the appointment.

Answer: The physicians who met the included patients were not informed of the ongoing study, hence we do not know if any of them conducted medication reconciliation (MR) at the index visit – we could not ask. This is now added to the limitations. Nevertheless, in our experience,
many physicians do not include the process of MR in their routines for a visit. A previous study by the last author found that 31% of GPs do not ask about medication intake other than in the EMR medication list and 14% do not update the medication list with other physicians’ prescriptions. Hence, we believe that the majority of the errors were not due to changes by the patient after the appointment, but were present already at the appointment. All patients denied changes of his/her drug regimen between the index GP visit and the medication data collection.

Along these lines, it is not clear whether the variable "visited a physician outside the PHC" refers to a patient having multiple primary care providers, the utilization of specialists who might have been asked to provide medication management, or whether this variable refers to having seen a provider subsequent to the index primary care visit (or any/all of the above).

Answer: This variable refers to patients having multiple care providers (one GP and one/many specialists) due to multiple conditions, which has now been clarified in the text (p 6 and 8).

The discussion emphasizes the role of the primary care provider in conducting medication reconciliation at each visit and maintaining an accurate medication list. It also states that the medication lists used as a comparator to the patient list were deemed "incorrect." Given that discrepancies included additional drugs, omitted drugs, as well as dose errors, I would appreciate the authors' thoughts on the degree to which discrepancies represented (a) failures to reconcile at the prior visit, (b) patient non-adherence or failure to understand the recommended regimen, and (c) in the presence of multiple prescribing providers- which list best represented a "gold standard" for the medication regimen a patient should have been following.

Answer: Thank you for this input. The discussion has been revised in-line with these thoughts, which has made the manuscript stronger (p7, line 12-15; p8, line 10-12).

In addition to the Coletti et al 2015 report that considered this issue in a slightly different way, the authors should review additional reports of medication review in primary care in the background section and to compare/contrast their results to existing literature. In particular, consider reviewing prior (and challenging) attempts to assess accuracy in medication lists pre-post medication reconciliation (see Stewart, A. L. & Lynch, K. J. (2014); Stewart et al., 2015).

Answer: The background (line 11-13) and the discussion (p9, line 1-3) have been revised in-line with the suggestion.