Author's response to reviews

Title: Comparative evaluation of different medication safety measures for the emergency department: physicians' usage and acceptance of training, poster, checklist and computerized decision support

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Author's response to reviews: see over
Description of changes made for the manuscript titled with:

“Comparative evaluation of different medication safety measures for the emergency department: physicians’ usage and acceptance of training, poster, checklist and computerized decision support”

Comment 2146491390919112, Reviewer: Hanna Seidling

General comments

(1) Please check again whether all abbreviation are introduced (e.g. UTAUT, ED) and then consequently used (e.g. drug-drug interactions is introduced twice). Thank you, all abbreviations were checked.

Specific comments

(2) page 5, line 18: I would suggest to mention in two or three words what the extensions TAM2 and TAM3 added to TAM
Thank you, has been done.

(3) page 6, line 5: Was this really a retrospective study? I understood that data were collected prospectively?
We retrospectively investigated usage and acceptance of the interventions by posing questions and looking back. The observation study helped us developing the questionnaire items; furthermore we retrospectively analyzed the system logs for cross-checking the observation results. With the questionnaire we asked participants e.g. to recall usage and to retrospectively assessing the interventions, which were implemented in the past.

(4) page 9, line 11: I believe that anonymity is rather difficult to guarantee if there are only 9 participants of a questionnaire who all work at the same department and demographic data such as job status, working experience and computer skills are documented
We agree with you that the absolute anonymization of data is not possible. But for minimizing the risk of assigning specific results to a specific person we (1) did not ask for identity data, e.g. date of birth/age or sex and (2) coarsened the demographic information by presenting it in condensed form (please see section “subject characteristics”). Apart from that, the demographic information never has been presented together with the belonging participant number or study result.

(5) page 12, line 18: I do not understand how, if not manually, drugs were entered in the case sheet
In our experiment, use of the electronic case sheet was voluntary and physicians were free to either record previous drugs each in detail in this case sheet or to only select the checkbox “medication according to annex”. In the latter case, medication was only recorded in the paper sheet or the paper medication list from family physician or nursing home was attached. When we wrote “manually entered”, we meant that detailed drugs were recorded. There was no automatic transfer/input of information from other systems or the insurance card. We consider that the word “manually” may be misleading and have therefore omitted this word.

(6) page 17, line 10ff: I still believe that a maximum of 8 questionnaires or ratings (sometimes even less) is too few to perform a correlation that delivers valid and representative results and would therefore strongly recommend to take this part off the manuscript until more data are available (including the respective paragraphs in the methods and discussion section).
After liaising with our statistical department, we have improved the statistical analysis methods and applied Monte Carlo approximations with 10,000 samples to correct for small sample size. We do agree with the general criticism that the sample size is very small. However, those results still found significant must surely be regarded as relevant. In contrast, with many correlation coefficients being non-significant even in the range of 0.7 to 0.8, the sensitivity of our study to detect other, potentially relevant correlations is admittedly low, as mentioned in the 'results discussion' section. Validity however does not appear jeopardized by the small sample size, because sampling of the field study
covered a reasonable proportion of eligible physicians. Participation of 9 of eligible 12 physicians (75%) in the TAM2 assessment leaves still room for volunteer bias, as now additionally mentioned in the 'limitations' section, but a questionnaire return rate of above 60% is usually considered representative.

(7) page 20, line 1: Is self-reported utilization really that low? I thought that 8 participants (from 9) indicated to use at least the digital case sheet daily or weekly?
See also table 3, table 4 and results section:
We had two questions in the questionnaire. The first was: "How often do you use the measures in your daily routine?" (item U3) with options “not at all”, “monthly”, “weekly”, “once a day” and “several times a day”. Answers are depicted in table 3, showing that the digital check is most often used daily (five of nine cases).
The second question concerned only cases with subjectively complicated drug history. There we asked “In case of a critical drug order: To what percentage do you use the measures?” (item U4). This question was most frequently answered with “up to 10%” for all interventions, which is rather low in our opinion. We altered the results and discussion section to better clarify the difference between the questions and the resulting conclusions.
If we estimate an average case between 15 and 30 minutes for a physician, he would see between 20 to 30 patients per shift. Using the system once daily means that he would use the test for every 20th to 30th patient. We do currently not know (further evaluation work may show this) how many of those 20-30 patients had objectively critical drug orders (e.g. 10 or more drugs). On the other hand, in self-assessment we would have expected a higher utilization than 10 % for those patients where physicians themselves thought that drug orders are difficult.

(8) page 20, line 13: How do you define Hawthorne effect in this context - wouldn't that imply that usage of any intervention was higher during the observation period than in reality?
Correctly, the original Hawthorne experiment resulted in a higher productivity among workers who participated in an observation experiment, even when no intervention (change of lighting) was applied. In its generalized form however a Hawthorne experiment should be interpreted as an influence of observation upon observed subjects which react different than expected (see e.g. Olson et al.: What we teach students about the Hawthorne studies: A review of content within a sample of introductory I-O and OB textbooks. The Industrial-Organizational Psychologist, January 2004: 41:3, page 31/ definitions). It may not be generalized, that they react positive, the reaction may be also negative (see e.g. Sittig DF: Work-sampling: a statistical approach to evaluation of the effect of computers on work patterns in the healthcare industry. Proc Annu Symp Comput Appl Med Care. 1992, page 540), which has for example been observed in time measurement studies, when workers took different, unrealistic times for certain work packages during observation.
Thus we argue that a Hawthorne effect could also be that physicians (due to previous paper-based interventions for better medication safety) wanted to show that they can manage sufficient medication safety without any additional tools or interventions, in order to prove that they do not require permanent support in this matter. We have added a half sentence to clarify.

(9) page 26, line 7: The conclusion section seems to be a bit long - is it possible to shorten that paragraph and emphasize on the main summary points?
The sections "what this study adds to knowledge” and “conclusion” have been rearranged to avoid duplications and to summarize future work in the abbreviated “conclusion” section.