Author's response to reviews

Title: Nurse anaesthetists- and OR nurses` adherence to WHO's Surgical Safety Checklist -a grounded theory study

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Version: 6 Date: 10 July 2012

Author's response to reviews: see over
Response to reviewers` report:

MS: 1608142719647704
Nurse anaesthetists- and OR nurses` adherence to WHO's Surgical Safety Checklist - a grounded theory study

Reviewer 1: Brigid Gillespie
Reviewer 2: Tanja Manser

We would like to thank the reviewers for their thorough and thoughtful critique of the above referenced manuscript. We believe that the suggested revisions have strengthened the paper. Our responses to each comment (in bold) are below the comments.

Reviewer 1:

1. Design- justification for the design using grounded theory approach and aligning this to the aim of the study is essential.
We agree to this assertion, and a justification for using grounded theory approach has been made in the manuscript, under introduction of “methods”.

2. Justification for the combination of individual and focus group interviews is required as the information garnered from each type of interview and the intent of these is quite different. Please provide some examples of interview questions.
We strongly agree that the information garnered from single- and focus group interview, and the intent of these is different. However, in grounded theory, theoretical sampling is not envisioned as a single, unidirectional line, but its process is guided by the developing grounded theory. Therefore, as the first two focus groups were conducted by sampling respondents by convenience, a purposeful strategy was used conducting the single interview, according to the respondents` different roles in the OR, and the process of validating the emerging theory. According to Glaser (Glaser,1978, p. 36) “the basic question in theoretical sampling is, what groups or subgroups does one turn to next in data collection?” These groups are not chosen before the research begins, but only as they are needed for their theoretical relevance for developing further emerging categories, as in this case.
Example of the opening question in all of the interviews “can you tell me what is has been like, using the WHO’s “Safe Surgery Checklist?” has been added in the manuscript, under “data collection” line 16. The semi-structured interview-guide is added in the supplementary file

3. Sampling – please explain why only scrub/scout and nurses and nurse anaesthetists were selected when the essence of this activity is team based, and thus necessarily includes surgeons and anaesthetists. Often a lack of medical involvement/support contributes as barriers to adoption of the checklist. To explore this issue without sampling medical practitioners seems to be telling on half the story.

We strongly agree that the surgeons`- and anaesthesiologists’ point of views towards the checklist also should be reflected, to elucidate all possible barriers preventing checklist compliance. However, according to the WHO implementation manual and the NHS (England and Wales), a checklist coordinator was appointed for each of the three different parts of the checklist; the nurse anaesthetist before induction of anaesthesia, and the operating room (OR) nurse before skin incision (Time Out)- and before the patient leaves the operating room. The responsibility of coordinating the checklist performance was thus left exclusively to the nurse profession, implying a demand for exploring their challenges, as the perspectives of the people involved are important in obtaining knowledge and ensuring the quality of checklist performance.

4. Information on the number of observations, hours etc should be included. The number of teams observed should also be noted.

We agree that this information needs to be emphasized in the manuscript. This has been done in section “data collection”, line 2: The observation of the checklist in use covered one operation, one team and their use of the checklist in the OR for one day.

5. When did data saturation occur during sampling and analysis? Please provide some information.

We agree that clarifying the process of data saturation is important, and has thus tried to emphasize our understanding of when and how data saturation was achieved in section “data analysis: The transcripts were analyzed using the constant comparative method: each interview was analyzed and compared to the previous interview combined with written textual
notes from the checklist observation in a continuous process [15-17]. In accordance with grounded theory methodology, an open coding was performed manually line-by-line, by the first author, constantly focusing on the incidents: the meaning, action, and interaction of “what is actually going on in the area studied”. The nurses’ main concern was identified after observation in the OR and performing two focus group interviews and one single interview. The last two focus group sessions were held to ensure variety in the data-material, and to enrich the emerging codes and hypotheses. Saturation in data was achieved after analyzing the last focus group interview, and the study progressed to identify patterns of behavior by which the nurses resolved their concern. Examples of an open coding from data are presented in Table 1. The codes were subsequently grouped into broader, tractable categories, and further into more extensive, universal categories, thereby translating the descriptive concepts until theoretical saturation was obtained [15-17]. During the whole process of analysis; memos, theoretical ideas about codes, categories and their relationships were written and used in the analysis. When the core category was identified, it was finally compared with the literature in the field according to Glaser, 1992, to see if the findings were supported [17].

6. Elements of rigour in relation to credibility, auditability, transferability and triangulation should be outlined and should follow the Analysis section.
We understand that these elements need to be highlighted in the manuscript. According to Glaser (Glaser et Strauss, 1967, Glaser, 1978, Glaser, 1992) the criteria of fit, work, relevance, and modifiability, reflect the quality of the grounded theory. This is described in section “trustworthiness”, from line 5 and throughout the section.

7. The Discussion section explores the notion of team involvement, however, this did not appear to be echoed or supported in the data/verbatim.
We understand that this term does not appear to be supported in the data. However, how the nurses related to the interdisciplinary team, and hence adjusted their own “team involvement” is the strategy of how they resolved their main concern; obtaining social and professional acceptance within the surgical team. Thus, this term is part of the emergent, grounded theory, and the notion of “team involvement” has evolved from the data analysis.

8. Under the Discussion section, headed, Strengths and Weaknesses, the Authors discuss sampling from different wards – and thus, the information
gleaned which would be inherently different due to differences in context. I do not understand the basis of this discussion point or it relevance.
We agree, and this part has been removed from the manuscript

Reviewer 2:

General assessment:
This is a qualitative study aiming to investigate barriers and facilitators of WHO safe surgery checklist from the point of view of the responsible nurses. While I find the subject very timely and relevant I am not very convinced by the analysis and the discussion of the results. My main concern with the manuscript is that not the use of the checklist is at the centre of attention but the concern of the nurses’ professional acceptance and the strategies they employ to obtain/maintain this. The checklist seems to be merely one occasion where this issue arises. The paper needs to be rewritten to reflect this. It has the potential to provide some interesting information on the prerequisites for nurses compliance with the checklist. I have provided suggestions for improvement and hope that these are useful in revising the manuscript.

1. Is the question posed by the authors well defined?
   - As stated in my general assessment of the manuscript, the focus seems to have shifted during the analysis. The main findings that are presented are not what is described in the research question. This needs some substantial rewriting. I would also suggest to review the literature on motivational drivers for “required work behaviors” such as subjective norm, theory of planned behavior / reasoned action, work role perceptions, contingency theory etc. This could be useful in the introduction or the discussion.

   >> Major Compulsory Revision
We agree that the main findings need to be clarified as to what extent the nurses` main concern reflects their behaviour, and thus their execution- and coordination of the checklist. Substantial changes have been made in the manuscript, throughout the entire “discussion” part. Due to a literature review, the following references are included in the manuscript: #11, #12, #19-22, #24-27, and # 30.
2. Are the methods appropriate and well described?

- There is some confusion as to individual versus focus group interviews and the role of the observations. To maintain the standards of qualitative research, it needs to be made clear which data were gathered in which way and how these data were entered into the data analysis process.

**>> Major Compulsory Revision**

We agree that the process of data collection needs clarification, and such an improvement has been made in the manuscript in, in section “data collection”: The observation of the checklist in use took place in the OR where the nurses performed their daily work, and covered one operation, one team and their use of the checklist in the OR for one day. A total of four focus group interviews were combined with one single interview. In grounded theory, collecting data is not envisioned as a single, unidirectional line, but its process is guided by the developing grounded theory [15-17]. Observational data was noted during and immediately after the observed operation. The notes were subsequently analyzed and were inherently the basis for development of the focus group interview guide [Supplementary file 1], and validation of interviewer’s role.

The observation and the interviews were conducted over a time period of four months. Each of the four focus group interviews lasted 45-60 minutes and the single interview lasted 40 minutes. A nurse, trained as a moderator, assisted in two of the four focus group interviews. To initiate free discussion open ended questions were used, and the interviews were conducted in hospital localities free of disturbance [14]. The two first focus group interviews were carried out using the first version of the interview guide, whereas a edited interview guide was used to conduct the last three interviews. All interviews had the same opening question: “Can you tell me what it has been like, using the WHO’s “Safe Surgery Checklist?” While the first interview guide focused on barriers and motivators in the use of checklists in general, the second interview guide focused on the challenges reflecting conditions and adaptive processes towards specific parts of the checklist. All interviews were recorded and transcribed verbatim. In accordance to the grounded theory, each transcript was analyzed before the next interview. Sampling was controlled by the emerging theory as in theoretical sampling, according to Glaser, 1978 [16].

However, the method of sampling used in grounded theory, theoretical sampling, is defined by Glaser (Glaser, 1978, p.36) as “the process of data collection for generating theory
whereby the analyst jointly collects, codes, and analyzes his data and decides what to collect next and where to find them, in order to develop his theory as it emerges”. The process of theoretical sampling is guided by the developing grounded theory, and the process of sampling, data collection, data analysis and theory construction occur concurrently. Thus, to prepare and develop the semi-structured interview-guide, one observation of the checklist in use, was made. A justification for the combination of individual and focus group interviews has been made in response to reviewer 1, point number 2.

- Some questions need to be clarified as well:
  - The first sentences of the participants section should be moved into a new procedure section.

We agree to this assessment. The sentence has been removed, and a new heading “participants and setting” has been added.

- Why did one nurse participate in the interviews twice?
One nurse participated twice; once in a focus group consisting of OR nurses, and once in a focus group with mixed groups of nurse anaesthetists, and OR nurses. She was purposively selected for the second interview, as contributing valuable incidents, as “incidents”, and “experiences” often are the basis for analysis in grounded theory methodology.

- It is unclear what you mean by stating that data were gathered based on grounded theory. This is rather a data analysis that data collection strategy. Did you mean that you performed narrative interviews? But then the focus groups seem to be semi-structured. This point requires clarification.
We understand that this part needs clarification, and such a clarification has been made in the manuscript, in the introduction part of the “methods” chapter:
Grounded theory is a qualitative, systematic approach used to explore processes in the context of situated interaction, with an embedded focus on human action and interactions, and involves the concurrent collection and analysis of data to formulate theories that are grounded in the world of the participants [15-17]. The intent of this research method is to move beyond description, and to generate or discover a theory that explains the situated actions and interactions as they experience, engage with, and manage the phenomenon of study. This is done by focusing on the main concern or problem that the individuals` behaviour is designed
to resolve [15-17]. The goal of grounded theory is thus to discover this main concern, and hence the social processes that explain how people continually resolve it. The main concern or problem must be discovered from the data.

However, in grounded theory methodology, sampling, data collection, data analysis and theory construction occur concurrently. This implies that in the early part of the study, variation sampling might be used. As in our study with separate focus groups consisting of nurse-anaesthetists- and OR nurses, this was done to gain insight into the range and complexity of the challenges of using the checklist. The method of data analysis involved a comparison of elements present in the focus group interview with those in another interview. Thus, emerging conceptualizations helped to inform the ongoing sampling process, until saturation. This way, data was both gathered - and analyzed according to grounded theory methodology.

- In describing the data analysis you mention frames that supported the data analysis. It is unclear if these were developed during the analysis or defined a priori. We agree that this needs to be clarified, and the section of “data analysis” has been re-written to reflect this:

The transcripts were analyzed using the constant comparative method: each interview was analyzed and compared to the previous interview combined with written textual notes from the checklist observation in a continuous process [15-17]. In accordance with grounded theory methodology, an open coding was performed manually line-by-line, by the first author, constantly focusing on the incidents: the meaning, action, and interaction of “what is actually going on in the area studied”. The nurses’ main concern was identified after observation in the OR and performing two focus group interviews and one single interview. The last two focus group sessions were held to ensure variety in the data-material, and to enrich the emerging codes and hypotheses. Saturation in data was achieved after analyzing the last focus group interview, and the study progressed to identify patterns of behavior by which the nurses resolved their concern. Examples of an open coding from data are presented in Table 1. The codes were subsequently grouped into broader, tractable categories, and further into more extensive, universal categories, thereby translating the descriptive concepts until theoretical saturation was obtained [15-17]. During the whole process of analysis; memos, theoretical ideas about codes, categories and their relationships were written and used in the analysis.
When the core category was identified, it was finally compared with the literature in the field according to Glaser, 1992, to see if the findings were supported [17].

- The last sentence of the data analysis section describes a step that is part of the discussion and should be removed. We understand that this part needs clarification. In the process of data sampling- and analysis in grounded theory, the final sampling often includes a search for confirming and disconfirming cases to test, refine and strengthen the theory, as was done in our study.

- In the results you mention “theories” that emerged from the interviews. I would prefer “themes” at this level of study. There are also some these that were appeared but not named such as “taking a leadership role” when doing the checklist. It seems typical for the nursing literature that the term Leadership is avoided although this is exactly what is described.

>> Minor Essential Revisions
We understand that the term of “theories” needs to be clarified. According to the Glaserian, grounded theory, conceptualization is essential. In grounded theory, the researcher generate emergent conceptual categories, and their properties and integrate them into substantive theory, grounded in the data. Names, and latent patterns are uncovered, and it is the pattern that a person engages in; not the person that is analyzed. People are not categorized, behavior is( Polit &Beck, p.230, 2008). “Themes” are not a common expression within the methodology of grounded theory. However, we have used the term “patterns of behavior” throughout the discussion section.

3. Are the data sound?
- The data seem to be sufficient. The quotes from the interviews are, however, no very clear and should be introduced better. Which aspect of the results do you want to highlight with the quotes?

>> Minor Essential Revision
We agree to the fact that the quotes from the interviews should be introduced better. The change consists of a better introduction to every quote in italic, presented in the ”result” section, under: “distancing team involvement”, “moderating team involvement”, and “engaging team involvement” in the manuscript.
4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
- The results and the discussion of results are not clearly distinguished. This leads to some results not being mentioned in the results but discussed later on. While this is often the case in qualitative research I would suggest to either integrate the two sections of the manuscript or to clearly separate them. In any case you should get rid of some of the redundancies and make room for a thorough discussion of your findings which integrates relevant literature.

>> Major Compulsory Revision
We agree to this, and the «result» and «discussion» sections are now clearly separated. The entire «discussion» section has been rewritten, including new literature as outlined: reference #11, #12, #19-22, #24-27, and #30.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
- The discussion should be more focused on the main results and provide a thorough discussion integrating relevant literature.
For example, one interesting discussion would be why the performance of the checklist is not perceived as taskwork. If nurses are charged with this task it should become part of their professional responsibility but it seems not to. It is these processes that we need to understand better to get at the core of why intervention do and do not work.
(see also comments to question 4)

>> Major Compulsory Revision
We agree to this, and the entire “discussion” chapter has been rewritten to reflect this.

6. Are limitations of the work clearly stated?
- It seems that the professional background of the interviewer may have biased the data collection and analysis. This should be discussed and countermeasures should be described.

>> Minor Essential Revision
In grounded theory, the researchers need to set aside, as much as possible, theoretical ideas or notions so that the analytic, substantive theory can emerge. This implies facing the difficulties of determining when categories were saturated or when the theory was sufficiently detailed. In our study, even though the interviewer had pre-existing relationship with some of the participants, data analysis- and the emerging theory was quality-assured by the entire study-group. A nurse, without relation to the participants, also contributed as moderator during the first two interviews.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
- Yes, except for the introduction as mentioned.

8. Do the title and abstract accurately convey what has been found?
- No. The title should reflect the issue of barriers to using the checklist and should make clear that you have a team involvement focus. Also the abstract focuses on the attitudes towards the checklist that are not prominent in the manuscript. The concern of the nurses’ professional acceptance is in the focus and the strategies they employ to do so. The checklist seems to be merely one occasion where this issue arises. This applies to the whole manuscript and should be reflected in the abstract (as well as the other changes suggested).

>> Major Compulsory Revision
We agree to this, and the title has been changed to:

Adjusting team involvement:
A grounded theory study of challenges in utilizing a surgical safety checklist as experienced by nurses in the operating room.

The abstract has also been rewritten to reflect the challenges of utilizing the checklist:
Background: Even though the use of perioperative checklists have resulted in significant reduction in postoperative mortality and morbidity, as well as improvements of important information communication, the utilization of checklists seems to vary, and perceived barriers are likely to influence compliance. In this grounded theory study we aimed to explore the challenges and strategies of performing the WHO`s Safe Surgical Checklist as experienced by the nurses appointed as checklist coordinators.
Methods: Grounded theory was used in gathering and analyzing data from observations of the checklist used in the operating room, in conjunction with single and focus group interviews. A purposeful sample of 14 nurse-anaesthetists and operating room nurses as surgical team members in a tertiary teaching hospital participated in the study.

Results: The nurses’ main concern regarding checklist utilization was identified as “how to obtain professional and social acceptance within the team”. The emergent grounded theory of “adjusting team involvement” consisted of three strategies; distancing, moderating and engaging team involvement. The use of these strategies explains how they resolved their challenges. Each strategy had corresponding conditions and consequences, determining checklist compliance, and how the checklist was used.

Conclusion: Even though nurses seem to have a loyal attitude towards the WHO’s checklist regarding their task work, they adjusted their surgical team involvement according to practical, social and professional conditions in their work environment. This might have resulted in the incomplete use of the checklist and therefore a low compliance rate. Findings also emphasized the importance of: a) management support when implementing WHO’s Safe Surgical Checklist, and b) interprofessional education approach to local adaptation of the checklists use.

9. Is the writing acceptable?
- The manuscript would benefit from proofreading by a native speaker.
Some things could be said in a more to the point. Repetitions should be avoided and the manuscript should be more focused on the actual research question of checklist use (and not so much general team involvement).
We agree with the point of view presented, and the manuscript has been proofread by a native speaker.

- Please define early on what you mean by the term “team involvement”.
We understand that this needs clarification, and such a definition has been made in the manuscript, in “discussion” part, under heading “task work and teamwork”, line #6.
- On page 13 you mention “random use of checklists” after describing the circumstances under which it is more or less likely to be used. Thus, the process does NOT seem to be random but the checklist is still infrequently used.

>> Minor Essential Revision

As a consequence to the structural and cultural barriers perceived, a limited use of the checklist was seen. The process of utilizing the checklist in general, seemed random, although there were specific condition involved causing the nurses to distance their team involvement, thus limiting their use of the checklist.