Reviewer’s report

Title: Effect of a one-person CRM team leader training on team performance and leadership behavior in simulated cardiac arrest scenarios: A prospective, randomized, controlled study

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Reviewer: Michaela Kolbe

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Effect of a one-person CRM team leader training on team performance and leadership behavior in simulated cardiac arrest scenarios: A prospective, randomized, controlled study

Thank you very much for the opportunity to review this manuscript! The authors have investigated whether training designated leaders in CRM would improve later team performance in a simulated cardiac arrest scenario. I think this is a very well-written paper with an appealing study idea. Improving performance of cardiac arrest treatment is very important. I agree with the authors with respect to the implications of their findings for designing curricula. With respect to the manuscript in its current form I have three main concerns:

1) Leadership theory: given the recent developments of leadership such as functional, dynamically delegated, or shared leadership, I do not yet understand the authors rationale for training only few potential leaders.

2) Validity: a) I noticed that you trained medical students and defined the leader before task performance began. I wonder how this could be applied to clinical practice. From my experience, it is exactly defining and maintaining a leader which is so challenging for multi-professional ad-hoc teams in hierarchically structured hospitals. I think this challenge is not represented in your study design. How do you see this? b) The CRM training you performed seemed to consist of presentations rather than experiential learning. I think that just paying attentions to presentations instead trying out new leadership behavior within a team, experiencing how team member react to this behavior and jointly reflecting on leadership behavior afterwards is essential for developing leadership skills and I am concerned that the participants could not learn this. What do you think?

3) Discussion/conclusion: I think some of your conclusions are too strong and are not based on your findings (particularly with respect to NFT).

Please find my detailed questions and comments below.

Background:

1. I did not see a definition of leadership and suggest providing one.

2. From what you have written it seems to me that you consider leadership as
certain communications performed by a pre-selected team member. I think that leadership is a social process that involves interactions among team members. Given recent concepts of leadership, such as functional leadership\(^1\) and dynamically delegated and shared leadership in healthcare\(^2\)\(^3\), what is your take on that?

3. I think teaching medical students team leadership is important. However, I think identifying and negotiating leadership ‘in the heat of the moment’ (e.g., a senior surgeon and a senior anesthesiologist managing a trauma – who is the leader?) in ad-hoc inter- and multi-professional teams is a huge problem which seems to me somewhat ignored in your study design by randomly designating a leader beforehand. Usually, nurses are present as well but I did not see them included in your study and I am concerned that this limits the validity of your study. What do you think? How do you see this leadership assignment applicable to clinical context?

4. With respect to new team concepts such as ‘teaming’\(^4\) and human resource development I am concerned that training only designated people as leaders will not contribute to fostering teamwork in healthcare. What do you think?

5. I think that training physicians and nurses would have been helpful is solving the aforementioned problem. What was your reason for training medical students?

6. Line 89: How do you define ‘team performance’ with respect to the previous hypotheses?

Methods:

1. I noticed that you compared team leader training vs. ALS training. I think that comparing team leader training vs. training the whole team would have allowed to you to conclude whether there was a particular benefit of training complete teams or whether training leaders only may suffice in improving performance. What was your reason for this particular design?

2. Training concepts: It looks like the CRM training consisted of presentations and did not include participants actively experiencing new behavior. I doubt that leadership can be meaningfully trained without experience-based learning, that is without actually trying out the new leadership behaviors and reflecting on them afterwards. From how I understand the literature of simulation-based training, experiential learning seems to be one of its fundaments.\(^5\)-\(^7\) How do you see this?

3. Outcome measure and assessment: in line 185 you write that “each observable verbalization that could be clearly classified into one of the categories was documented” and that the Kappa was 0.61. That think this Kappa value indicates that the classification process was not fully “clear”, which I think is normal in this kind of research. What do you think?

Results:

1. I suggest providing t-values and confidence intervals in table 2.
Discussion:

1. How do you explain your findings regarding Hypothesis 4? If it is not leadership communication, what do you think accounts for the differences you found?

2. In line 225 you write “interactive CRM training”. I did not understand the interactive component. Could you clarify, please?

3. In line 227 (and in line 246) you write that teams composed of one CRM-trained team leader showed lower NFT and you continue using this conclusion throughout the rest of the manuscript. Given the results you reported on p. 11, the difference between intervention and control group was statistically not significant. Thus, I do not think your conclusions are justified and I am concerned that they mislead the reader. What do you think?

4. In line 229 you are referring to “higher quality verbal behavior (TLV)”. From how I understand your coding and findings, you analyzed certain communications made by team leaders and found statistically more of them in the intervention group. Thus, I think you found a higher quantity of TLV but I do not see a higher quality of TLV. How do you see it?

5. Starting in line 240 you state that “it is not the allotment of the role of a team leader and her/his training in managing the task technically that seems to be crucial for the whole team to perform well but rather explicit (i.e., CRM) training in how to manage the resources of a team in order to perform its task in a planned and well-coordinated way.” As mentioned before, I do not think that you tested this assumption (because you did not compare allotting the team leader role vs. not allotting the team leader role). Therefore, I think your conclusion is not justified by your study findings. What do you think?

6. Line 274 – 277 – I find this section hard to understand. What is the point you are making?

7. Line 278 – 280, I think conclusion .b is not justified because you did not investigate this. What do you think?

8. Line 300, I am curious about your reason for suggesting teaching CPR leadership separately.

9. What are the theoretical and practical implications of your study?

I look forward to the revision!

References


**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.