Title: Basic life support is effectively taught in groups of three, five and eight medical students. A prospective, randomized and double-blind study.

Authors:

Moritz Mahling (moritz@mahling.eu)
Alexander Münch (me@alexandermuench.eu)
Sebastian Schenk (s.schenk@student.uni-tuebingen.de)
Stephan Volkert (stephan.volkert@student.uni-tuebingen.de)
Andreas Rein (AndreasRein@t-online.de)
Uwe Teichner (uwe.teichner@med.uni-tuebingen.de)
Pascal Piontek (pascalpiontek@web.de)
Leopold Haffner (leohaffner@gmail.com)
Daniel Heine (daniel.heine@med.uni-tuebingen.de)
Andreas Manger (andreas.manger@med.uni-tuebingen.de)
Jörg Reutershan (joerg.reutershan@med.uni-tuebingen.de)
Peter Rosenberger (peter.rosenberger@med.uni-tuebingen.de)
Anne Herrmann-Werner (anne.herrmann-werner@med.uni-tuebingen.de)
Stephan Zipfel (stephan.zipfel@med.uni-tuebingen.de)
Nora Celebi (nora_celebi@vertexbreeder.com)

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Author's response to reviews: see over
Basic life support is effectively taught in groups of three, five and eight students. A prospective, randomized and double-blind study.

Dear Dr. Ulep, Dear Cherrylyn Raytos,

Again, we thank you and the reviewer for the helpful comments. We revised the manuscript, and new changes made to this version are highlighted in orange.

**Referee 2**

**Minor remarks**

**Comment 1:** The answer to referee 1 states that students practiced in groups of three (two performing compressions and one ventilating). That seems quite crucial to understanding the study. However, I could not find this in the methods section.

**Authors’ reply:** This is indeed very important. The following sentence was added to the methods section: “Each student was allowed to train assessment, chest compressions and bag-mask ventilation individually before practicing a comprehensive BLS resuscitation.” (page 7, lines 12-14).

**Discretionary remarks**

**Comment 2:** General thought: if I would want to determine the best group size, I would not keep hands-on time similar. I would keep total time similar, and try to find out from what group size on the learning outcomes would start to decrease.

**Authors’ reply:** This is an interesting variation of the methodology, which has been discussed by the authors while planning the study. However, as this was one of the first studies covering the impact on the group size of learning outcomes, we decided to keep the possible confounders as small as possible and therefore standardized the hands-on time. Using the results presented in this manuscript, your comment represents an interesting follow-up study which is worth to investigate in further studies.

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**Comment 3:** Abstract: “students prefer teaching in small groups”: While that may be true, to me the most important reasons for small group teaching is that it is already known to be effective. That is more important than student preference. Just the exact group size is unknown.

**Authors’ reply:** We agree. The sentence “Students commonly prefer teaching in small groups” has been replaced by “Small-group teaching is effective” (page 3, line 3).

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Comment 4: Abstract: I am still puzzled why a time slot of 6 minutes of hands-on time per student was reserved, while actual hands-on time was in the range of 2-4 minutes. That merits an explanation.

Authors' reply: We calculated with five minutes per student for the actual hands on and one minute for the rotation. However, the students were allowed to stop training when they and the tutor felt that they were well prepared. In addition the definition of “minutes practical training per participant” in the teaching protocol was more comprehensive than the definition of “hands-on time” that was used for the evaluation. When planning the 6 minutes practicing time, this also accounted for questions to be asked and time the student needs to get comfortable with the ventilation bag. However, in order to achieve a standardized evaluation by the video raters, hands-on time there was defined as the time actually spend practicing with the manikin.

We amended the methods section as follows: “The total training time was calculated to facilitate the amount of participating students (20 minutes introduction + 6 minutes practical training per participant, including hands-on training as well as time needed for rotation, familiarization and individual questions)” (page 7, lines 15-16)

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Comment 5: Abstract: “comparably” should be “comparable”. The conclusion that smaller groups “enable better teaching” seems an overstatement. Learning outcomes were similar for all groups, so how can there be “better teaching”?

Authors’ reply: The part of the sentence “but smaller groups enable better teaching” has been replaced by “but smaller groups yielded more intense teaching conditions”. (page 4, line 1-2). The last sentence of the abstract now reads “Our results suggest that teaching BLS skills is effective in groups up to eight medical students, but smaller groups yielded more intense teaching conditions, which might be crucial for more complex skills or less advanced students.”.

The word “comparably” has been replaced by “comparable”.

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Comment 6: Page 15: I am not convinced from the results that smaller groups are “the better investment”. Learning outcomes were similar, but there were differences in process.

Authors’ reply: This is an important discussion, and were share the distinction you made between outcomes and process. When putting this sentence in the conclusion, we wanted to prevent that our results are interpreted to easily as “larger group teaching is feasible”, without taking care of some other disadvantages that might come with larger groups (some of them that we have disclosed, and other’s that might be beyond the scope of our investigation).

The sentence was modified as follows: “Therefore these results warrant careful interpretation, as smaller groups may be advantageous for more complex skills.” (page 15, lines 19-20)

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Comment 7: Table 2: the proportion of students adhering to the guideline provides useful insights. For compression depth, X3 had 56% and X8 had 78% of students performing according to the guidelines. Is that difference significant? It appears that the X3 group did actually worse.
Authors’ reply: This is indeed an interesting observation. We performed a Chi-Square test using JMP software to detect if the frequencies in the three groups (X3, X5 and X8) were different, regarding the amount of students within the recommended ranges for the compression depth and frequency after the training. No significant differences were detected. However, we realized that we did not report this, which is why we amended the results section (page 11, lines 3-5).

We hope that the revised manuscript is acceptable for publication and hope to be hearing from you soon.

Yours sincerely,

Moritz Mahling   Anne Herrmann-Werner   Nora Celebi