Reviewer’s report

Title: Educational Standards for Training Paramedics in Ultrasound: A Scoping Review

Version: 0 Date: 01 May 2017

Reviewer: Scott Goldberg

Reviewer’s report:

The article by Meadley, et al presents a scoping review of educational models for ultrasound training of paramedics in the out-of-hospital setting. Overall, it is well written and the methodology sound. With some minor revisions, it would make a welcome addition to the medical literature on the topic.

The background section nicely highlights the possible uses of point-of-care ultrasound (POCUS) in the field. Additional background as to the available training modalities for POCUS, including their benefits and limitations, would be welcome but is not essential. Further, the background might differentiate physician and non-physician systems of EMS care. Reference to "combined EMS providers (4.89) is somewhat confusing and could be better defined.

The methods section is well written and appropriate. The search strategy is thorough and would seem to capture all appropriate references. The methods refer to exclusion of studies "if the participants were not exclusively paramedics" (5.136). This is confusing as many of the articles include EMTs, physicians, nurses, or other provider types. I imagine the authors meant that articles were excluded if they did not include paramedic providers, but this could be clarified.

The results section is extensive and descriptive. The use of subheadings is not particularly helpful, and the authors may consider removing these, although this is not necessary. I question the inclusion of the study by Cappa et al (2015). This study appears to have been performed in the ED setting, and the differentiation between paramedics and nurses is unclear. The outcome measure, decreased placement of central lines, is not applicable to the out-of-hospital environment.

In the discussion section, the authors reference a difference between "the critical care paramedic group" (12.292). However, groups are not clearly defined in the methods or results section, making this claim somewhat confusing. Likewise, they state that "data available at this time does not show a significant difference between the groups" (12.294). This review was not designed to evaluate statistical significance, so I would consider clarifying or rephrasing. The specific mention of the study by Golgalniceanu (12.300) seems out of place and might be removed. The authors state that paramedics might gain proficiency "regardless of base qualification, experience, duration or perceived quality of training (13.337) however immediately qualify this claim by citing a study in which providers had on average greater than 10 years' experience. This argument is confusing. Otherwise, the discussion is well written and thorough, and highlights many of the salient points regarding the challenges of ultrasound training to field providers.
Particularly useful is the discussion of future directions, which might further highlight shortcomings in the existing literature.

Overall, this scoping review is well-written, thorough, and a welcome addition to the medical literature. The methodology is sound and the results comprehensive. The tables are formatted cleanly and would be a valuable resource to practitioners and researchers alike. I thank the authors for their work on this manuscript and for the opportunity to provide these comments.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Unable to assess

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
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Not relevant to this manuscript

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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