March 22, 2018

Dear Professor Liam Messin:

We appreciated your precious comments on our submission entitled “Musculoskeletal Ultrasound Workshops in Postgraduate Physician Training: A Pre- and Post-workshop Survey of 156 Participants!”

We have incorporated several of your suggestions into our revised manuscript. Specifically, we have:

- Clarified the purpose and methodology of our workshops
- Added examples of specific workshops
- Provided further details on the survey results
- Improved the clarity and conciseness of our writing

We are confident that our revised manuscript now better reflects the expertise and insights you provided.

Thank you once again for your time and effort in reviewing our work. We value your feedback and look forward to exploring new opportunities to improve our research.

Best regards,

Wei-Ting Wu
Ke-Vin Chang
Der-Sheng Han
Levent Özcakar
156 Participants”. We have revised our manuscript based on the comments of the reviewers. We again thanked your great effort in improving the quality of the study.

This manuscript has not been accepted or published and is not under simultaneous consideration for publication elsewhere. It has been reviewed and approved by each author, and we have taken due care to ensure the integrity of this submission.

Sincerely,

Ke-Vin Chang, MD, PhD
Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, Bei-Hu Branch

Response to Reviewer 1

Comment:

Jillian L Clarke, PhD (Reviewer 1): Thank you for the opportunity to review this article. It is a thoughtful, interesting and well-illustrated account of an educational program which needs just small amendments to scholarly writing and some typographical errors corrected.

Response:

We appreciate the kind comment from Professor Clarke.

The two substantive amendments are:

Comment:

1. Line 76:

'Compared with cardiac, renal, breast, and gynecological sonography, which target only specific organ regions, musculoskeletal ultrasonography (MSKUS) comprises dynamic evaluations and/or assessments of different structures (the ligaments, tendons, muscles, vessels and nerves [2-5])'

This comparison should be avoided, as almost all ultrasound examinations are dynamic, and every ultrasound examination requires assessment of multiple different structures. Further, each of the mentioned anatomical areas (cardiac, renal, breast, gynecology) involves multiple surrounding structures that are included in the ultrasound assessment. Please revise.
Response:

We totally agree with the precious opinion. The comparative part has been removed as suggested. The expression “like” has been used instead of “compared with”. The whole sentence has been revised as “Like cardiac, renal, breast, and gynecological sonography, musculoskeletal ultrasonography (MSKUS) comprises dynamic evaluations and/or assessments of different structures (the ligaments, tendons, muscles, vessels and nerves” (marked copy, line 76-79).

Comment:

2. Line 317 - Limitations section. It is important in this section to acknowledge the simple nature of the questions asked of participants, and the lack of use of an educational evaluation theoretical model (e.g. Kirkpatrick's Four Levels, or equivalent). This has been partially accomplished in the 'third limitation' but should be enhanced.

Response:

We totally agree with the precious opinion. We have added this raised point in the limitation as “Fourth, the simple nature of the questions administered to the participants should be acknowledged as well as the lack of use of an educational evaluation theoretic model. The four levels of Kirkpatrick's evaluation model, or equivalent would be incorporated in developing our future course” (marked copy, line 346-350).

Minor changes required:

Comment:

Line 54 - quotation marks at end of sentence should be removed.

Response:

The quotation mark has been removed in the revised manuscript.

Comment:

Line 85 - 'obese' rather than 'obess'

Response:

We have corrected the typo accordingly.
Line 90 - needs a supporting reference

Response:

The reference “Nineteen reasons why physiatrists should do musculoskeletal ultrasound: EURO-MUSCULUS/USPRM recommendations (AJPMR 2015)” has been cited accordingly.

Comment

Line 106 - 'method' rather than 'way'

Response:

We have changed “way” to “method” accordingly. (marked copy, line 110).

Comment:

111 - whether physicians felt it useful

Response:

We have added “it” between felt and useful according to the reviewer’s suggestion (marked copy, line 117).

Comment:

137 - regional

Response:

We have corrected the typo accordingly (marked copy, line 145).

Comment:

161 - respond to the questionnaires

Response:

We have added “to” between “respond” and “the” accordingly (marked copy, line 169).

Comment:
178 - the relationship of Reference 13 to the statement is unclear

Response:

Reference 13 has been removed from the revised manuscript.

Comment:

192 - Three courses had been held annually

Response:

We have added “been” between “had” and “held” accordingly (marked copy, line 200).

Comment:

236 - how was 'previous experience' defined?

Response:

We have revised it as “years of experience in performing MSKUS” and cited “Appendix I” for clarification (marked copy, line 244-245).

Comment:

253 to end of paragraph - the meaning is unclear, please revise

Response:

We have revised the part as “A plausible explanation for this finding could be that in our workshop, the theoretical session incorporated fundamental sonoanatomy and clinical applications of MSKUS, which made the attendee feel as useful as the hands-on practice session (marked copy, line 261-264).

Comment:

260 - 'The perceived confidence, apart from perceived usefulness' What do you mean by this? Please clarify

Response:
We find that “apart from perceived usefulness” is redundant and has been eliminated accordingly (marked copy, line 270).

Comment:
301 - 'older' rather than 'elder'
Response:
We have changed “elder” to “older” accordingly (marked copy, line 311).

Comment:
307 - 'hands-on' rather than 'hand-on'
342 - hands-on
Response:
We have changed “hand-on” to “hands-on” accordingly.

Comment:
362 - Author's contributions - there is duplication of the contributions of K-VC, please revise.
Response:
The duplication part has been removed.

Comment:
372 - 'The' rather than 'the'
Response:
We have changed “the” to “The”.

Comment:
Appendix 1 - Preworkshop rather than preworkshop
Appendix 2 - evaluation rather than evaluation

Response:

We have corrected both typos accordingly.

Response to Reviewer 2

Comment:

SHADI LAHHAM (Reviewer 2): Thank you for allowing me to review this manuscript by Wu et al. Briefly, this is study evaluating physicians who were given a brief ultrasound course and then given questionnaires regarding their experiences.

Response:

We appreciate the valuable comment from professor Lahhan. The article has been revised according to the comments.

Comment:

Introduction: I think the current introduction is too broad. I would suggest that the authors focus instead on POCUS in the hands of minimally trained physicians and cite other studies that have evaluated this similar question. I would suggest reviewing the Bernard article in more detail. The second paragraph of the introduction is quite long and has several articles listed. I would trim this paragraph down significantly. I would ask that a third paragraph be made in the introduction to specify the objectives of this study. Line 106, change staring to "starting".

Response:

(1) We have reduced some redundant sentence in the first paragraph. In the second paragraph, we address the emerging use of point-of-care ultrasound by citing 2 important articles from our 2nd reviewer, professor Lahhan (Utility of common bile duct measurement in ED point of care ultrasound: A prospective study. Am J Emerg Med 2018; Prospective evaluation of point-of-care ultrasound for pre-procedure identification of landmarks versus traditional palpation for lumbar puncture. World J Emerg Med 2016). We aslo emphasize the usefulness of POCUS in recognizing musculoskeletal disorders. Lastly, we cite another references to enhance the importance of integration of didactics and small group hands-on teaching sessions (Pilot Point-of-Care Ultrasound Curriculum at Harvard Medical School: Early Experience. West J Emerg Med 2016).

The second paragraph has been revised to focus on POCUS as “Recently, point-of-care ultrasound (POCUS) has been increasingly used at patients’ bedside for diagnostic and
therapeutic purposes [10, 11]. POCUS also enables emergency or primary care physicians to quickly recognize musculoskeletal and soft tissue disorders and to provide better and safer cares [12]. Kelm et al. revealed that a longitudinal curriculum for POCUS enhanced knowledge retention and the ability to recognize pathological findings for internal medicine residents [13]. Rempell et al. also found that training of POCUS could be successfully administered by integration of didactics and small group hands-on teaching sessions [14]. Therefore, based on the available literature, an organized course integrating multiple components, such as lectures of ultrasound physics and sonoanatomy, along with tutor demonstrations and practice on volunteers, appeared to be the most efficient method of ultrasound education. Starting from 2015, we developed a two-day MSKUS course incorporating the didactic and hand-on teaching sessions based on 6 different joints. However, we were not aware whether the short-term course was as helpful as the aforementioned ultrasound curriculum’ (marked copy, line 97-115).

(2) The objective of the present study has been separated from the second paragraph.

(3) We have changed “staring” to “starting”.

Comment:

Methods: the first paragraph needs significant modifications to include more details on the course. What type of study was this? Was there IRB approval? Did you get consent? Give us more information on the participants. This information is listed in the results but should be part of methods.

Response:

We have added information according to the suggestion as “The present study employed a retrospective cross-sectional design. The target attendees of the 2-day course were postgraduate physicians. Most of the attendees were physiatrists. Other participants included orthopedic surgeons, family physicians, emergency medicine specialists, neurologists, anesthesiologists, radiologists, rheumatologists, pediatricians, neurosurgeons, and etc. The workshop has been held annually since 2015 by our department of physical medicine and rehabilitation, in collaboration with the medical ultrasound society. Registration for the workshop was open to physicians from all specialties. The study was approved by the institution’s review board of National Taiwan University Hospital (IRB NO. 201707033 RINB), and the need for informed consent was waived due to the retrospective nature of the research. The data were processed and analyzed anonymously”(marked copy, line 126-136).

Comment:

Discussion: I think this discussion is well written. I would focus a bit more on previous work and how your work is different or adds anything new to the literature. Consider proposing modifications or future studies.
Response:

Regarding the comparison with previous work and proposed modification of future studies, we have stated in the discussion as “The strength of our study was that we evaluated the perceived course usefulness and post-learning confidence based on different body regions, which had rarely been reported in previous literature. Our analysis helped identification of a gap regarding the current course arrangement. In the present program, the faculty-to-student ratio and length of hands-on practice were the same at each session. However, our data revealed inadequacy of education in hip sonoanatomy and intensity of hands-on practice. Therefore, we suggested increasing the number of instructors and duration of practice in the hip session in the next workshop. Concerning future courses, interventional ultrasonography seemed to be the most favorite topic. Different from diagnostic ultrasonography, interventional ultrasonography focuses on target selection and needling techniques. Herein, a successful interventional treatment is always based on an initial correct diagnosis, both of which can readily be done with the use of ultrasonographic imaging. Likewise, ultrasound-guided interventional techniques can be incorporated in advanced courses for physicians who already have the basic knowledge of diagnostic ultrasound” (marked copy, line 314-326).

We also mention the importance of adding the evaluation models in our future workshop as “Fourth, the simple nature of the questions administered to the participants should be acknowledged as well as the lack of use of an educational evaluation theoretic model. The four levels of Kirkpatrick's evaluation model, or equivalent would be incorporated in developing our future course” (marked copy, line 345-349).