Author’s response to reviews

Title: Preclinical Curriculum of Prospective Case-Based Teaching with Faculty- and Student-Blinded Approach

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December 15, 2018

Dear Dr. Anna Phillips:

Thank you for the feedback regarding our manuscript titled “Preclinical Curriculum of Prospective Case-Based Teaching with Faculty- and Student-Blinded Approach” (MEED-D-18-00947).

We have carefully reviewed the comments and suggested revisions from the reviewers. We have made all recommended revisions to the manuscript and believe that these changes have contributed additional value to our report. Below we have addressed all comments by the reviewers and have indicated what changes we made to the manuscript to address those requested revisions.

Thank you for considering our revised manuscript for publication in BMC Medical Education. We look forward to hearing from you.

Regards,

Lars Osterberg, MD, MPH
Reviewer 1 Dianne Delva, M.D.

Comment # 1: It would be helpful to describe the alternative learning of the convenience control group. As this was an elective course, how were the students different from the other groups who did not participate?

Response: The course participants and the control students both participated in the same required medical school curricula at our institution. The course described in this manuscript was the only difference in curriculum between the two groups.

Action taken: We have added the following content to the Methods subsection titled “Settings and Participants”:

The course participants and the control students participated in the same required medical school curricula throughout both the first and second preclinical years, with the reported elective course being the only difference in curricular experience between the two groups.

Comment # 2: I would question how well the students become active learners in these large groups despite the attempt at interaction. With 1 hour sessions of 40-50 participants and both the discussant and facilitator, for many this may serve as a demonstration.

Response: For each teaching session of the course described in this manuscript, the unblinded faculty facilitator had previously prepared specific prompting questions to ask students to ensure student participation and engagement in the case-based discussions. Blinded faculty discussants recruited for the course were also instructed in advance to consistently ask questions to engage students in the process of working through the cases. Discussants in this course were members of the teaching faculty at our university and were already accustomed to promoting student participation during didactic sessions, allowing us to ensure that students would become active learners in the large group sessions.

Action taken: We have added the following content to the Methods subsection “Curriculum Design” to describe how we were able to ensure student engagement during the sessions:

The facilitator had prepared specific prompting questions to ask students to ensure student participation and engagement in the case-based discussions. Discussants recruited for the course were also instructed in advance to consistently ask questions to engage students in the process of working through the cases.
Comment # 3: Early students typically are uncomfortable with uncertainty and become more comfortable as the knowledge base grows. It might be useful to examine this aspect with qualitative review.

Response: We appreciate this very valuable suggestion. We have reviewed literature on diagnostic uncertainty and intolerance of ambiguity in clinical decision making among medical students.

Action taken: We have added content from our literature review on this topic to the fifth paragraph of the discussion section.

Now reads as follows: In traditional case-based learning sessions, hindsight bias may skew instruction and facilitation of discussions by faculty, reducing student exposure to the inherent uncertainty that accompanies clinical reasoning when physicians consider between competing diagnostic possibilities in the actual clinical setting. Uncertainty in clinical decision making is an infrequently studied source of distress for medical students and physicians.45–48 Causes of medical uncertainty include technical sources pertaining to uncertainty about medical information; personal sources relating to obscurity of patients’ wishes; and conceptual sources pertaining to ambiguity of applying guidelines or past experiences to the care of current patients.15 Past studies have demonstrated a high prevalence of intolerance for uncertainty among medical students, with greater intolerance for uncertainty associated with an aversion to fields such as primary care and psychiatry.47,48 Contrary to what might be expected, level of intolerance for ambiguity has been shown not to vary over the four years of medical school.48 Exposure to cases involving ambiguous clinical information is currently not well-integrated in preclinical medical education; the focus on retrospective case-based discussions in the curriculum may lead to overconfidence among medical students in making clinical decisions and less tolerance for navigating diagnostic uncertainty.15,17,19 Our course model of blinded clinicians role modeling their clinical reasoning while working through cases prospectively aimed to increase student exposure to the process of navigating ambiguous clinical presentations. These prospective case-based discussions allowed a more authentic illustration of problem-solving methods in the absence of hindsight bias in a manner more similar to actual clinical cognition.

Previously read as follows: In traditional case-based learning sessions, this bias may skew their instruction and facilitation of discussions, reducing student exposure to the inherent uncertainty that accompanies clinical reasoning when physicians consider between competing diagnostic possibilities in the actual clinical setting. Our course model of blinded clinicians role modeling their clinical reasoning while working through cases prospectively allowed a more authentic illustration of problem-solving methods in the absence of hindsight bias in a manner more similar to actual clinical cognition.

Comment # 4: Does this course lead to better outcomes post-clerkship or will this be attenuated by the other experiences of the clinical students?
Response: Our exempted IRB protocol did not include assessments of post-clerkship performance, which would be difficult to ascertain as most course participants attend different residency sites after completing clerkships. However, we believe that this is a limitation of our method of evaluating our curriculum and not to the actual format of the curriculum described in this manuscript.

Action taken: We have addressed this limitation of our study by adding the following comment to the limitations section of our manuscript: Furthermore, we were unable to evaluate whether our curricular method led to long-term improvements in clinical skills among course participants compared with non-participants lasting beyond completion of medical school.

Comment # 5. Abstract - Might read: During the 2016 course iteration, a quasi-experimental study compared self-reported clinical skills between 29 course participants.

Response: We agree with this suggested revision.

Action taken:

Now reads as follows: During the 2016 course iteration, a quasi-experimental study compared self-reported clinical skills between 29 course participants (response rate: 29/49 [59.2%]) and 35 non-participant controls (response rate: 35/132 [26.5%]).

Previously read as follows: During the 2016 course iteration, a quasi-experimental study compared clinical skills between 29 course participants (response rate: 29/49 [59.2%]) and 35 non-participant controls (response rate: 35/132 [26.5%]).

Comment # 6. Abstract Conclusion: "Prospective case-based discussions are effective in teaching cognitive reasoning skills" is not supported by the paper, only by self-report.

Response: We have edited that sentence in our abstract to more accurately reflect our development of the curriculum described in the manuscript.

Action taken:

Now reads as follows: Prospective case-based discussions with blinding faculty and students to clinical content circumvents hindsight bias and may impart real-world cognitive skills as determined by student self-report.

Previously read as follows: Prospective case-based discussions are effective in teaching cognitive reasoning skills. Blinding faculty and students to clinical content in case-based teaching is feasible and may impart real-world cognitive skills by avoiding hindsight bias.
Reviewer 2 Professor Mitra Amini

Comment # 1. Abstract: Please add information about students self-assessment and the assessment methods including questionnaires.

Response: We previously had only briefly described the assessment method in the abstract to allow brevity. We agree with adding additional content to the abstract to describe our assessment method.

Action taken: We have added the following content to the Methods subsection of the Abstract: A 14-item survey addressing components of the reporter-interpreter-manager-educator (RIME) scheme was developed and used to compare self-reported clinical skills between course participants and non-participant controls during the 2016 course iteration.

Comment # 2. You should add more articles to show the effect of case based learning in earlier years in medical school. You focused more on CPCs that are more useful for clinical students. You should show how case based learning is important for improving learning of basic sciences and the importance of using basic sciences in answering the cases.

Response: We have done a literature search on studies evaluating the efficacy of case-based learning as measured by student satisfaction with their training, self-assessment of clinical skills, and objective tests of knowledge. We have added content to the Background section citing studies that demonstrated efficacy of CBL in improving basic science and clinical knowledge of medical students. We have also added additional content from our literature search on CBL to the first paragraph of the discussion section.

Action taken:

We have added this sentence to the first paragraph of the Background section:

Furthermore, multiple studies have demonstrated that utilization of cases in curricula is effective in increasing basic science and clinical knowledge of medical students and enhancing their skills in applying that knowledge towards patient cases.10–12

Additionally, we have amended the first paragraph of our Discussion section to address the literature on the efficacy of case-based learning:

Now reads as follows: Case-based learning (CBL) is a widespread pedagogical method in medical school curricula. Case-based teaching methods have been demonstrated to lead to improved satisfaction of health professional students with their clinical education. 12,36,37 Furthermore, integrating cases into curricula has been shown to enhance basic science or clinical knowledge as evaluated by self-assessment surveys12,38–40 or objective measures of skills.10–12 Since adult learning theory suggests that learning is most effective when individuals are asked to apply the newly acquired knowledge to real-life scenarios,3,4 thought leaders in medical
Education have encouraged the use of real clinical cases in CBL, allowing curricular teaching to emulate authentic clinical cognition. However, a major deficit to the current format of case-based teaching in the medical school curriculum is the presence of hindsight bias in the setting of full disclosure of case information to faculty instructors. This feature of case-based instruction creates a discrepancy between the clinical reasoning that students are exposed to in the preclinical curriculum and the prospective clinical cognition inherent in real-world medical care. To avoid hindsight bias in preclinical instruction, we developed a curriculum that implemented blinding of both faculty discussants and students during case-based discussions.

Previously read as follows: The current format of case-based teaching in the medical school curriculum is influenced by hindsight bias in the setting of full disclosure of case information to faculty instructors. This feature of case-based instruction creates a discrepancy between the clinical reasoning that students are exposed to in the preclinical curriculum and the prospective clinical cognition inherent in real-world medical care. To avoid hindsight bias in preclinical instruction, we developed a curriculum that implemented blinding of both faculty discussants and students during case-based discussions.