Author’s response to reviews

Title: Situational Awareness within Objective Structured Clinical Examination (OSCE) Stations in Undergraduate Medical Training - A Literature Search

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Author’s response to reviews:

Dear Editor and Reviewers

I am writing to resubmit our manuscript "Situational Awareness within Objective Structured Clinical Examination (OSCE) Stations in Undergraduate Medical Training - A Literature Review" (MEED-D-16-00733R1).

By incorporating their valued recommendations, we included two content matter experts with expertise in the field of Medical Education and Situational Awareness as co-authors for the publication.

• Prof Stephen Durning, Professor of Medicine and Pathology, Uniformed Services University, Bethesda, and Chair, Association for Medical Education Europe (AMEE) Research Group

• Prof M Schijven, MD, PhD, MHSc, Surgeon Academic Medical Center Amsterdam, the Netherlands, President of the Dutch Society of Simulation in Healthcare
Additionally, we applied the search strategy to include the period from January 2016 up to February 2017. Findings were updated accordingly in the method section and the results section.

Thank you very much for your supporting recommendations for improvement of the paper and the opportunity to re-submit the revised version of the manuscript.

Thank you for receiving our resubmitted manuscript and considering it for review. We appreciate your time and look forward to your response.

Kindest regards,

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Following up on the reviewer reports we amended the paper as followed:

Andrea Vallevand (Reviewer 1): Article Review: Situational Awareness

While incorporating whatever changes are requested by the Journal's Editor (and certainly before this article is re-submitted), I would recommend that the authors read the entire submission out loud to identify less than clear sentences. As an example, please read out loud, the sentence between lines 112 and 115.
Following this recommendation, the authors amended the paper in a more logical order to achieve a clearer understanding of the underlying message. Long sentences or paragraphs with no clear message were also reconsidered and corrected accordingly. This progress resulted in a re-arrangement of paragraphs or elimination of text passages if identified as contribution to confusion.

Overall, I am a little confused about the flow of the article. The authors start with patient safety, move to the aviation field, introduce Endsley's Model of Situational Awareness, SA's training in non-technical skills and then discuss clinicians being unaware of SA and, thus, not being able to convey data gathering and its incorporation into the diagnostic process. The authors then focus a section on Clinical Reasoning and then introduce OSCEs and whether they are a suitable instrument for assessing SA.

The authors reviewed the article in that respect and addressed the concerns about adding to the confusion of the reader. We amended the paper in a way focusing on elements of SA which are embedded in the clinical reasoning process and simultaneously, could be potentially assessed in OSCEs. Endsley’s model of SA was selected as fundamental structure, which was basically developed for aviation and subsequently applied in other high-risk environments.

Are the authors trying to "parallel and integrate" Situational Awareness and Clinical Reasoning? Judging by the Figure and the first sentence of the Conclusion, I would suspect so and that's a very interesting viewpoint, which I find extremely compelling. Having said all that, this integration has not been presented clearly enough in the Introduction.

We addressed this recommendation by amending the introduction to explain that elements of SA are embedded in the clinical reasoning process, which is directed by the situation and context of the patient’s condition. The ability for clinical reasoning necessitates recognition and incorporation of multiple individual aspects of a patient, which enables the selection of the best treatment option in any given clinical presentation.

The authors state that the purpose was to review the literature to identify the parameters of SA, based on Endsley's Model, which can be assessed in OSCE stations.

The authors have provided an informative table that outlines which of the SA levels are represented in the nine articles identified. My recommendation is that the authors, starting at line
provide a section on the SA Level findings. For example, all nine articles incorporated Level 1 (perception information gathering). Be sure to provide examples. Of course the most compelling section will be on the research that incorporated all three Levels, but if your purpose is to identify parameters of SA found in OSCEs, the results should be presented.

We extended the search of the literature including 2016 until February 2017, adding another two relevant publications to the results section.

We amended the table to provide a more detailed information on the findings for each Level of SA in the identified papers. Additionally, the following paragraph was added to the results section:

Level 1 were identified in 11 publications, mostly seen in elements such as physical examinations, history taking but also in obtaining an overall impression of the patient and the retrieval of diagnostic test results. All 11 studies demonstrated continuative evaluation of elements of SA Level 2, demonstrated by the integration of the gathered parameters in SA Level 1 into further information processing steps. Only two studies assessed the selection process of optional diagnostic and treatment modalities categorised in SA level 3.

This paragraph was removed as it was collaboratively identified by the authors as not being relevant once the paper was critically reviewed and amended accordingly.

Please list some examples of these contributing causes (e.g., interpersonal communication and crew coordination) of deficient crew performance so that the reader, who may be unfamiliar with Crew Resource Management, can have a frame of reference of these causes.

This paragraph was removed as it was collaboratively identified by the authors as not being relevant once the paper was critically reviewed and amended accordingly.

Please incorporate "Endsley's Model of Situational Awareness" as a preface to the description of the 3 Levels of the Model. Also, you need to refer to the Figure you have included.

A figure was developed to explain the underlying structure of Endsley’s model of SA. The figure was noted in the text as well.
Line 104: Please clarify. You state that "some medical schools have incorporated patient safety education into their curricula". Have all of these programs emphasized SA as a cornerstone of curriculum design by integrating the 12 tips outlined in the Armitage article? Or, is the Armitage 12 tips for implementing patient safety article a recommended resource for implementing a patient safety curriculum and is, thus, independent of the General Medical Council?

As the paper focusses on SA in OSCEs we removed the potentially confusing content relating to patient safety. While some schools indicated that they incorporated patient safety teaching into their curriculum, only one school highlighted SA as part of that introduction into their training.

Lines 105-111: I am unclear as to the purpose of this section. You start by stating students learn clinically from experienced doctors. Then you state that professional clinicians are commonly unaware of SA and cannot convey the key critical information that must be identified and integrated for effective clinical reasoning. Is this section intended to provide support for the development of patient safety education that integrates SA as a critical objective of the curriculum?

The intention of this section is to describe that fact, that expertise in reading, understanding and responding to a situation develops over time. Additional information was added to support the understanding of the impact of elements of SA for developing expertise in diagnostic and clinical reasoning.

Clinical expertise in diagnosing a patient such as pattern recognition and selecting the best optional treatment develops over many years based on knowledge and experience. Novice students are characterised as “unconsciously incompetent”, described as not knowing what they don’t know. Due to the overload with new information novices often are cognitively overburdened. Due to increased cognitive workload in identifying essential data, novices are seen to have an incomplete or defective perception of the situation. Professional clinicians developed their mental models or illness scripts over many years, which enables fast non-analytical thinking. If the situation is not completely understood, clinical experts are able to switch to analytical thinking. However, they are commonly unaware of elements of SA as part of the clinical reasoning. Thus, they generally cannot convey or teach this process of data gathering and incorporation into the cognitive process. As a result, observing senior tutors might not enable students to develop incremental levels from conscious incompetence towards conscious competence through perceiving the essential steps of identifying and integrating relevant information for CR.
Line 127: Schuwirth's commentary on what topic? Why would you use "conclusive performance" rather than outcome based assessment of clinical reasoning, if that is the term used by Schuwirth?

In order to use own words, I selected “conclusive performance”. Following your recommendation I reworded the sentence using the original words by Schuwirth.

Line 141: Sandars. I would recommend you remove "Prof"

The entire paragraph was removed based on the amendments to the entire introduction section, when focusing primarily on SA.

Line 144: What is "augmented awareness"? You have not used this term in the paper up to this point. If there are various terms that are used interchangeably to describe SA, you need to list them.

Again, using own wording resulted in the term “augmented awareness”. However, because this paragraph was contributing to confusion, the entire text passage was removed.

Line 149: OSCEs are, in theory, intended to evaluate the effectiveness of the curriculum - I'm not sure I would go so far to state "OSCEs allow".

We amended the sentence according to your recommendation.

Line 161: What is "sense-making"? I know it was one of your search terms, but again, refer to the comment on "augmented awareness". You may want to add a sentence in the Introduction section that addresses the various terms used by other authors to describe SA.
One definition we followed states that “sense-making is the process of creating situational awareness and understanding in situations of high complexity or uncertainty in order to make decisions. It is a motivated, continuous effort to understand connections in order to anticipate their trajectories and act effectively”.

However, due to availability of more definitions and the equivocality in the context of the sentence the term was removed.

Line 201: The term "system thinking" is not defined. Actually, in the Varkey article it is referred as "systems thinking" as in "systems thinking through history taking and communication", p. 50. The paragraph describing the Varkey research is extremely unclear. Furthermore, the authors have not articulated what levels of SA (as defined by Endsley) were addressed in the Varkey research. This is particularly important as the authors have cited Varkey as suggesting OSCEs were an ideal tool for assessing SA (lines 261-262).

Varkey, in her paper, recommended OSCEs to reflect utilisation of SA.

An appraisal of the study design of the utilised simulation scenario, however, revealed that a root cause analysis was undertaken by the medical students to identify a prescription error. Part of the examination focused on SA Level 1 when students were asked to take a history of the incident and SA Level 2 when integrating this data into the understanding of the situation. The authors suggested OSCEs to reflect utilisation of SA, however, neither a definition of the meaning nor the model of SA used for the conclusion was provided.

Line 222: I would suggest including the six evaluation criteria in parentheses to provide a frame of reference.

We followed the recommendation and amended accordingly.

Line 278: "This was seen in a paper-based scenario". Technically it was not seen in a paper-based scenario. Paper-based scenarios were utilized (two formats) and the results demonstrated what exactly.
Upon providing either clinical vignette format or the chief complaint format in paper-based scenarios, Nendaz and colleagues compared students, residents and general internists abilities in considering differential diagnosis (SA Level 2) or selecting diagnostic formats (SA level 1) and considering treatment options (SA Level 3). Thereby they noted that students were seen to be able to demonstrate knowledge and carry out examinations, but struggled to incorporate the data into further diagnostic processes.

Line 282: Gruppen has two co-authors. So, Gruppen and colleagues…. In their study..

This was reviewed for all references and amended accordingly.

Line 300: Baker is identified as the author on line 297. "They" have not been provided a citation number and there is no "Baker et al" noted in the Reference List.

This was addressed accordingly.

Figure: "Generating" is spelled incorrectly in the SA Level 3 component of the illustration.

The figure was replaced by another figure and the correction of the spelling incorporated.

Table: I would suggest adding a column that documents the specific task being assessed during the OSCE. For example, Varkey used a station on prescriptions. You might add a column on the Year of Training, and the number of participants in the research. Also, there is no reference to the table in the text.

We included further columns as recommended and the table was amended to incorporate elements of each Level of SA identified in the selected papers.

The table is also referenced in the text.
Jianlin Hou (Reviewer 2):

This is an interesting study with informative message. At the same time, some changes may be needed:

(1) Consider submitting the manuscript as a review instead of a research article. If not, please state your research questions and hypothesis;

I couldn’t identify the option to submit the paper as a review with BMC Medical Education. Therefore, the decision was made to submit the paper as research article.

(2) Consider improve writing of the manuscript. For example, it seems that there are too many "of" and "the". Furthermore, consider shortening long sentences (e.g. line 112-115 of page 4, line 338-341 of page 13) to make it easier for readers to follow your ideas.

We took these points into consideration when rewriting the paper to achieve an improvement of the flow and understanding. The paper was amended in a way to focus on elements of SA which can be assessed by way of OSCEs.

(3) What IDEA stands for in Page 12?

IDEA is used as name for the specific assessment tool developed by Baker et al. utilising the first letters of each individual step. Interpretative summary, Differential diagnosis, Explanation of reasoning and Alternative diagnostics (IDEA).

(4) Consider rewriting the Discussion in your own words and avoid presenting too many results of other studies.

The discussion was critically reviewed and rephrased, additional information was added if felt helpful to explain the need for further explorations within the field assessment of elements of SA during undergraduate medical education. References cited within the discussion section are seen as supportive and relevant to explain the summary and outcome of our literature search.