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A peer-led mock OSCE improves student confidence for summative OSCE assessments in a traditional medical course

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ABSTRACT

Background: Objective structured clinical examinations (OSCEs) can induce states of stress and anxiety in students, possibly negatively impacting student performance. Students in traditional-style medical courses especially have limited clinical exposure prior to their first clinical examination. We describe the design and implementation of a near-peer-led mock OSCE for fourth year medical students, and its impact on students' self-rated confidence.

Methods: An OSCE training programme was designed by penultimate and final year medical students. It involved the recruitment of 12 peer tutors to facilitate the running and feedback of a mock OSCE to 82 fourth year (and second year graduate) medical students delivered over 2 days, prior to their end-of-year exam. Students completed a post activity questionnaire to assess the quality and perceived benefits of the mock OSCE.

Results: A total of 78 students completed the survey, giving a response rate of 92.8%. 100% of respondents felt the OSCE was well run, well-structured and highlighted areas of weakness in their knowledge and skills. Students reported the OSCE significantly improved their confidence for their summative OSCE. The main themes from the student comments were feeling empowered and feeling that the mock OSCE was realistic.

Conclusions: The near-peer-led OSCE significantly improved student confidence for OSCEs for fourth year undergraduate and second year graduate students studying a traditional medical course and was well reviewed by students.

KEYWORDS

Medical education research; peer; clinical; OSCE; undergraduate

Introduction

Objective Structured Clinical Examinations (OSCEs) are an integral part of summative assessment in many medicine courses across the world (Zayyan 2011). These assessments aim to evaluate the key clinical skills that medical students need to acquire to practice successfully as doctors, including (but not limited to) history-taking, examination of patients and interpretation of laboratory, radiological and other investigations. This examination format is generally viewed as a reliable and valid approach to assessing competencies for medical students, which has led to its ubiquitous nature as an assessment mode in a variety of medical courses (Barman 2005).

Despite their wide ranging use at medical schools, it has been well recognized that OSCEs can be a great source of stress for medical students, and may be thought of by students as the most anxiety-inducing method of examination at medical school (Brand and Schoonheim-Klein 2009). Research indicates that performance pressure, coupled with perceived problems such as inherently subjective examination grading and relatively high frequency of such assessments, result in their oft-perceived role as significant stressors for medical students (Hameed et al. 2017).

Practice points

- Students with no prior OSCE experience on a more traditional medical course found a peer-led mock OSCE to be a fair assessment of their skills which was well structured and administered.
- Peer-led mock OSCEs significantly improve the confidence of students without previous OSCE experience for their forthcoming summative examinations.
- This evidence indicates with confidence that peer-led mock OSCEs can be integrated with good effect into more traditional medical courses.
- More research is needed to determine the extent to which students' increased confidence is attributable to the peer-led nature of the mock OSCE, or whether increased confidence is related to taking part in practice assessments more generally.

Arguably, then, it should be incumbent upon clinical teachers to endeavour to alleviate some of the anxiety associated with OSCE examinations, in order to help students make the most of the learning experiences that

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OSCEs can afford them. The peer-to-peer teaching model in tertiary education was first proposed in 1988 by Whitman and Fife (Whitman and Fife 1988), and since then has been gaining popularity as a strategy in medical education. Evidence indicates that peer-led mock OSCE examinations are felt to be feasible models by both learners and tutors, and may help reduce student examination-related stress, improve overall confidence and help to guide students' revision and preparation for the eventual summative examinations (Young et al. 2014; Bevan et al. 2019).

Peer-led tutoring programmes may be seen as less anxiety-provoking alternatives to faculty-led teaching sessions at medical school (Frisch et al. 2020), and as such it is unsurprising that the slightly more informal environment of peer-led examination models would also be felt to be a less stress-inducing way to prepare for summative examinations. Furthermore, peer-assisted teaching has shown to be beneficial for the student teachers as well, as they help to develop professionalism and deeper understanding of the subject matter (Kim 2016).

Medical school courses differ significantly in their approach to delivering medical education, and this may have ramifications on performance in postgraduate examinations and future training (McManus et al. 2020). The more "traditional" model used to approach medical education involves a strong divide between the pre-clinical course (generally the first 2 or 3 years), followed by the clinical course, with most formal teaching being didactic and lecture based (British Medical Association 2020), with a large emphasis on students to become independent learners through experience in the clinical environment. In this model, there is generally very little exposure to clinical environments or patient contact in the pre-clinical years, and as such little or no exposure to OSCE-style examinations in those years. This contrasts with more "integrated" courses that expose students to clinical work earlier on and generally adopts a more "systems based" approach (British Medical Association 2020). While the integrated teaching approach has been quite widely promoted in more recent times, for example in the United Kingdom by the General Medical Council in *Tomorrow's Doctors* and later in *Outcomes for Graduates* (GMC 2018), some medical schools around the world still choose to deliver a more traditional, divided course.

In investigating students' perceptions of traditional medical courses, it has been found that students on these types of courses may feel unprepared for the reality of being a junior doctor, and that they feel that too much focus was placed on basic science lectures which ultimately did not feel very relevant to actual clinical practice as a doctor (Watmough et al. 2009). OSCEs are often the primary way in which important clinical skills relevant to becoming a junior doctor are examined at medical school, and yet may not routinely feature in the pre-clinical component of traditional courses, which could exacerbate the potential issue of unpreparedness.

Given the anxiety around OSCEs, the evidence demonstrating efficacy of peer-led teaching and examination models, and the relative lack of OSCE examinations testing clinical skills in the earlier years of traditional courses, the authors were interested to determine the efficacy of a near peer-led mock OSCE examination in students on a traditional medical course with no prior exposure to the OSCE format. Data were gathered to determine whether this type

of peer-led OSCE was an appropriate way to help students with very little previous clinical exposure and no previous OSCE exposure feel more confident for the summative end-of-year OSCE.

Methods

For the benefit of readers not familiar with the structure of this UK-based degree, we will outline the programme. The Medicine degree at the University of Oxford comprises a 6-year undergraduate degree or a 4-year graduate degree. Summative OSCEs are at the end of the 4th, 5th and 6th years of the undergraduate degree and at the end of the 2nd, 3rd and 4th years of the graduate degree. The mock OSCE was designed and delivered by twelve students in their penultimate and final years, and delivered to learners in 4th year of the undergraduate degree and 2nd year of the graduate degree (learners in their first "clinical" year of study.) The learners had the same prior exposure to clinical medicine, therefore can be treated as the same group.

Participants were recruited via email sign-up form. The OSCE was designed with capacity for 84 students out of a total of 156 students invited, representing 53.8% of eligible students. Two sessions were designed, consisting of an initial 10-minute briefing, followed by the OSCE itself lasting for a total of 42 minutes, followed by an additional 15-minute period for group and individual debriefing and feedback. Participants for the mock OSCE were drawn from the undergraduate (6 year) and graduate entry (4 year) medicine courses at the University of Oxford. Participation was offered to all fourth-year undergraduate and second-year graduate students, the equivalent in both courses of the first clinical year of the course. Places were offered on a self-selecting, first-come-first served basis. All final year and fifth year (or third year graduate-entry) students were offered the opportunity to participate as tutors. In order to run the session effectively, a total of 10 tutors were required for each session.

A total of 12 groups of 5–6 students each participated in the OSCE, with each OSCE consisting of six stations. A total of 82 students participated in the mock OSCE. One and a half minutes were allocated to read a short brief posted outside setting out the scenario, followed by 6 minutes for the station itself. Following the end of this time, one and a half minutes were allocated to leave the station, move on to the next station and read the short brief for the subsequent station. Skills examined at each station included history taking (including assessment of communication skills), medical clinical examination (consisting of either cardiovascular, respiratory, or a neurological examination), surgical clinical examination (consisting of either neck, peripheral vascular or abdominal examination), interpretation of laboratory results (such as full blood count, urea and electrolytes, liver function tests, or arterial blood gas measurements), interpretation of electrocardiogram (ECG) and plain chest radiograph (CXR), and interpretation of a fluid balance chart. Exact stations and content included in each of the 2 sessions held can be seen in Table 1.

Topics to be examined at each station were selected based on their inclusion in the syllabus for the end-of-year assessment OSCE for 4th year/2nd year graduate entry courses. Stations 1, 2 and 3 each had 1 "patient" and 1 tutor

Table 1. Topics examined at each station in both the first and second sitting of the mock OSCE.

Station Number	OSCE 1	OSCE 2
1	History Taking + Communication Skills – Chest pain	History Taking and Communication Skills – Shortness of breath
2	Examination – Cardiovascular	Examination – Respiratory
3	Examination – Peripheral arterial	Examination – Neck
4	Laboratory Results – ABG, U&Es, FBC, LFTs in acute pancreatitis	Laboratory Results – ABG, U&Es, FBC, LFTs in Acute Pancreatitis
5	ECG (atrial fibrillation) and CXR (misplaced nasogastric tube)	ECG (myocardial infarction) and CXR (large pulmonary mass)
6	Fluid balance – Blocked urinary catheter	Fluid Balance – Oliguria

Table 2. Questions asked in Section B of feedback questionnaire.

Questions
1. "The Mock OSCE was a fair assessment of the skills required to pass the 4th year course/2nd year graduate entry course."
2. "The Mock OSCE covered a wide area of knowledge."
3. "The Mock OSCE was administered well."
4. "The Mock OSCE was stressful."
5. "The Mock OSCE was well structured."
6. "The Mock OSCE highlighted areas of weakness in my knowledge and skills."
7. "I found the Mock OSCE to be an intimidating experience."

acting as examiner in the room with the participant, whilst stations 4, 5 and 6 each contained a tutor examiner only. Tutors took turns examining and playing the patient for each station. History and communication skills were assessed together in station 1, with the participants' history taking skills assessed by the tutor acting as examiner and their communication skills assessed by the tutor acting as patient. Standardised mark schemes were used by tutors to score each participant, with the completed mark scheme and written feedback also provided to each participant following the completion of the mock OSCE. Participants were also offered a verbal debrief with the tutors and organisers following the end of each session. Following the conclusion of the session, qualitative and quantitative data was collected from participants by way of completion of an online survey. This was distributed by QR code and direct web link to participants.

The questionnaire was divided into 5 sections. For Section A, students were asked to provide free text feedback on both the content of the station and the near-peer tutor acting as examiner of each station. Students were also asked to provide free text general feedback on the mock OSCE as a whole and how it could be improved. Section B asked students to rate their agreement with several statements relating to the mock OSCE, using a 5-point Likert scale, where "1" was "strongly disagree," and "5" was "strongly agree". The questions selected to be asked to students were chosen based on informal discussions with the tutors who had all previously completed the end of 4th year/2nd year graduate entry OSCE. These questions can be seen in Table 2.

Section C asked students to retrospectively rate how confident they felt about their upcoming summative OSCE before taking part in the mock OSCE, and then to rate how confident they felt about it following taking part in the mock OSCE, again using a 5-point Likert Scale, where "1" was "not at all confident" and "5" was "very confident".

Section D collected free text qualitative data on participants' experience of the mock OSCE as a whole and collected suggestions for how it could be improved in future. Qualitative responses were analysed thematically by the 2 researchers who agreed a consensus on the main themes elicited.

Statistical analysis showed all Likert-scale derived quantitative data to be non-parametric in nature, so Chi-squared

goodness of fit test was used for all data sets, with the exception of comparing students' self-rated confidence pre and post OSCE, for which a Wilcoxon signed rank test was used. For all data where a Chi-squared test was used, Likert scale responses 1 and 2 were combined into a single category for analysis (for example, "very likely" and "likely" were combined into a single response category), as were responses given as 4 or 5, such that all Chi-squared analysis was completed using 3 degrees of freedom.

An inductive coding method of thematic analysis (Braun and Clarke 2006) was used for qualitative data. Responses were read, noting connections between items and ideas, in order to obtain a list of initial codes, followed by searching for broader themes. Then a review of codes under each theme was undertaken to ensure adequate supporting data, sorting themes to ensure data were distinctive enough to justify separation. A re-reading of the original data ensured the theme adequately represented the whole body of data, followed by naming of themes. Both researchers coded independently and discrepancies were resolved by mutual agreement.

Results

A total of 82 students participated in the mock OSCE, which included 73 undergraduates and 9 graduates. 78 of these participants completed the post mock OSCE questionnaire, giving a response rate of 95.1%.

98% of participants agreed or strongly agreed that the mock OSCE was fair ($p < 0.001$). 100% of participants agreed or strongly agreed that the mock OSCE was well administered ($p < 0.001$). 100% of participants agreed or strongly agreed that the mock OSCE was well structured ($p < 0.001$). Furthermore, 100% of participants agreed that the mock OSCE highlighted areas of weakness in their knowledge and skills ($p < 0.001$).

33% of participants agreed or strongly agreed that they found the mock OSCE stressful, while 32% disagreed or strongly disagreed that they found it stressful, with 35% neither agreeing nor disagreeing that they found it stressful ($p = 0.962$, not statistically significant). Although there was therefore no significant evidence that the OSCE was perceived as stressful, it is not necessarily the case that it was not stressful. Additionally, 14% agreed or strongly agreed with the statement that they found the mock OSCE intimidating, with 59% disagreeing or strongly disagreeing, and 27% neither agreeing nor disagreeing ($p < 0.001$). We can therefore say with confidence that the mock OSCE was not generally experienced as intimidating by students. Full results with the frequency of each response to each question can be seen in Figure 1.

Regarding self-rated student confidence pre and post the mock OSCE, the modal response to the question "Please rate how confident you were about the 4th year/

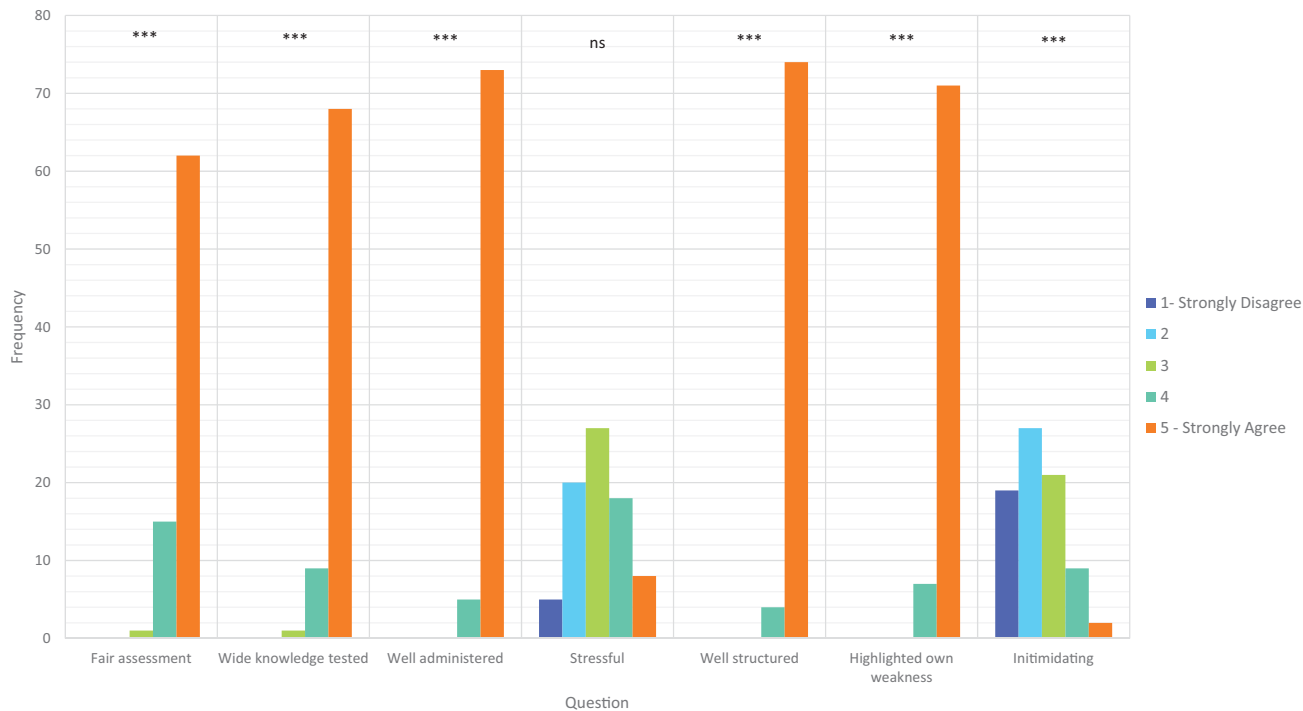


Figure 1. Student opinions on mock OSCE according to questions asked in Section B of the questionnaire. Chi-squared test used for statistical tests of significance. Where *** indicated, $p < 0.001$. ns = not statistically significant. For full details of the questions asked, please refer to Table 2.

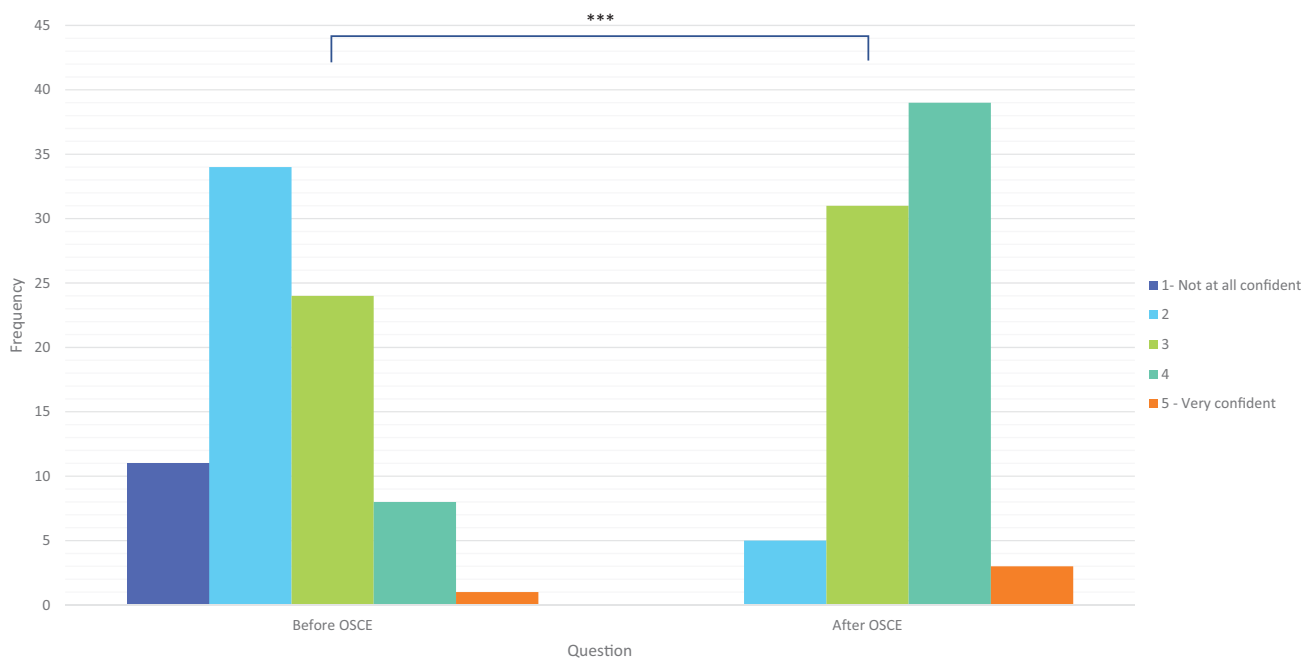


Figure 2. Student responses to ratings of their own self confidence before taking the mock OSCE, and after taking the mock OSCE. Wilcoxon signed rank test used for test of statistical significance. Where *** indicated, $p < 0.001$.

2nd year graduate OSCE before today” was 2 (where “1” was “not at all confident” and “5” was “very confident”). The modal response to the question “Please rate how confident you were about the 4th year/2nd year graduate OSCE after today” was 4 ($p < 0.001$). Full results can be seen in Figure 2. We can therefore conclude that our mock OSCE significantly increased student confidence about their own performance in their end-of-year assessment OSCE.

Analysis of the qualitative data by the research team identified eight main themes, drawn from both the questions in section D. These were: “Organisation,” “Familiarising” “Development,” “Empowerment,” “Gratitude,”

“Realism” and “Expansion.” Representative comments from participants along with the themes identified from them can be seen in Table 3.

Discussion

The peer-run mock OSCE was well reviewed by students in this study. Our results indicated with a high degree of confidence that students felt that the peer-run mock OSCE was well structured and delivered, a fair assessment of students’ skills and knowledge and served to

Table 3. Qualitative Themes identified from Section D of feedback questionnaire.

Themes	Comments
Organisation	"Very well organised" "Well organised and the examiners were very nice" "Amazingly well organised and really useful practice"
Familiarising	"Really helpful to be able to practise the format and OSCE stations" "Really good to get to practise the format before the actual OSCE" "Really useful to get a feel for it and really well run, I enjoyed it"
Development	"Helped me see what I need to look over/refresh my memory" "this experience has ... highlighted areas that require more work."
Empowerment	"Really useful, learnt a lot, showed holes in my knowledge" "I was very nervous before today and this experience has helped improve my confidence" "Felt more confident afterwards"
Expansion	"made me feel a lot more comfortable in being able to approach OSCE" "More stations would be useful" "Wouldn't mind more stations as practice"
Gratitude	"(could be improved by) ... Practicing clinical skills under exam conditions" "Thanks so much for taking so much of your time to do it!" "Really helpful – thanks so much to everyone for doing it!"
Realism	"The whole team was brilliant – very friendly, professional, and genuinely passionate about teaching" "Really good to have structure and it was really like a real OSCE" "Extremely well run and realistic" "Really useful to see how (OSCEs) are run. I wasn't sure what info would be available before stations"

highlight areas of weakness in those students' skills and knowledge. Therefore, this data supports and adds to the published body of evidence supporting the efficacy of peer-led mock examination models, but also expands on this evidence to demonstrate that this model is equally efficacious for OSCE-naive students in more traditional medical courses.

Interestingly, despite the fact that these students had no prior experience of OSCE examinations, they did not find the experience to be significantly stressful or intimidating, further suggesting that the model is feasible and can be expanded to include this group of students. Students have reported that peer-led teaching programmes provide a less intimidating and threatening environment for learning (de Menezes and Premnath 2016), and it can be theorised that this feeling therefore applies to peer-led mock examinations as well. The concept of social and cognitive congruence, in which teaching is delivered by those with a similar level of knowledge and recent experience as the learners, has been shown in peer-to-peer teaching studies to significantly reduce intimidation and provide a low-stress environment for learners (Lockspeiser et al. 2008). From our data we can infer that the positive effect of this congruence applies not just to peer-led teaching programmes but also to peer-led mock OSCEs as in our study, and helps to explain why students evaluated the mock OSCEs so positively.

There are some limitations to this study. As recruitment was completed on a first-come-first served basis, this represents a convenience sample, introducing the risk of sampling bias. Students signing up to the mock OSCE may be more likely to find it a useful learning exercise, independent of the design of the mock OSCE itself. Furthermore, the absence of a control group hinders the study's ability to draw conclusions on the significance of the peer-led factor of the mock OSCE, or whether increased confidence was simply secondary to extra preparatory work.

The questionnaires given to the students were all completed after the mock exam had taken place, and therefore answers may be subject to recall bias – most notably when students had to rate their OSCE confidence prior to the mock OSCE. Qualitative data were not collected to interrogate students' perceptions, and further work could

investigate why students did or did not find the experience of the mock OSCE intimidating or stressful, which could inform future improvements. Additionally, no control group was used to make a comparison on whether alternative methods other than a mock OSCE could have had a similar or better positive effect on students' confidence for summative examinations, though clearly this would have been difficult to facilitate.

Additionally, formal feedback was not collected from peer tutors in order to assess whether tutors felt the mock OSCE was well run and whether there were any modifications or improvements that they may suggest for the future. Evidence has indicated that peer teachers benefit as much as learners from peer-led programmes, as they value the revision of consolidation of material afforded by teaching it (de Menezes and Premnath 2016) and so collection of qualitative and quantitative data on tutors assessment of the benefits they gained from examining these mock OSCEs would be interesting.

There are several avenues for future research in this area. We know from this data that students feel more confident in tackling their forthcoming OSCE examinations, and an obvious next step would be to assess whether the peer-led mock OSCEs improve students' actual scores in the formal summative OSCE at the end of the year. Similarly, it would be interesting to assess whether their role as examiners in mock OSCEs has any effect on the peer-tutors performance in their own summative examinations, as it has been demonstrated that those who examine a subject tend to perform better when examined on that topic themselves (Wong et al. 2007). Delineation of the significance of the peer-led element could be elicited by using a control group in which the mock OSCE is delivered by medical school faculty. These data may help to further support the notion that peer-led mock OSCEs are valuable methods of exam preparation for students.

Furthermore, as another avenue of evaluation and assessment it would be beneficial as a next step to involve medical school faculty members in monitoring the mock OSCEs and providing feedback. The importance of faculty involvement in monitoring the peer-led teaching programmes has been highlighted (Reyes et al. 2014) and we recognise the importance of experienced faculty in

troubleshooting problems with both the logistics of delivery of such mock examinations, but also in answering questions and discussing cases that peer-tutors may themselves feel unsure of, to ensure that learners always meet their appropriate learning objectives.

In this study, the authors were interested in assessing whether students from traditional medical courses who are OSCE-naïve respond well to peer-led mock OSCEs. Further work could assess students' and tutors' perceptions of mock OSCEs in a direct comparison between all types of medical courses, to determine whether students' feel the same way about peer-led examinations regardless of course design, or whether course structure impacts their feelings about this kind of mock examination design.

In summary, this data supports the idea that peer-led mock OSCEs are felt by learners to be well structured and delivered, applicable and useful and not particularly stressful. Importantly, it has demonstrated that students on traditional medical courses with no previous OSCE exposure and less total clinical exposure respond very well to this type of mock examination, supporting their integration into these types of medical courses.

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Ethical approval

The data presented was previously collected in 2019 for the purposes of service evaluation with the aim of improving the peer-led mock OSCE for future sessions. The collected data was fully anonymous, non-NHS data with no personal data provided, and cannot be traced back to an individual by the researchers, and therefore does not meet the definition of research requiring research ethics committee approval, as per the guidelines issued by the NHS Health Research Authority.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Glossary

Traditional Medical Course: A primary medical qualification usually characterized by an early emphasis on preclinical medical science for the first two or three years, with minimal exposure to patients or the clinical environment. This is typically then followed by three years of clinical study.

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