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ORIGINAL ARTICLE

Comparison of Methods of Assessment and Results of Traditional Osce with Electronic-Osce

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ABSTRACT

Introduction: The onset and rise of COVID-19 and its sudden progression to a worldwide pandemic lead medical and dental institutes to change their way of teaching and conducting assessments to distance learning as compared to the previously applied conventional approaches. Teaching and assessment during this era have changed vastly, earlier it was solely traditional/live Objective Structured Clinical Examination (OSCE) but due to the current circumstances electronic/online OSCE (E-OSCE) method was introduced. In Pakistan also, Pakistan Medical Council (PMC) and the College of Physicians and Surgeons of Pakistan (CPSP) conducted online exams so that the scheduled exams do not get delayed.

Aim: The main objective of this paper is to measure the reliability of an E-OSCE and to compare it with the traditional OSCE.

Methodology: This was a cross-sectional study which got conducted at the Rawal Institute of Health Sciences, Islamabad. Traditional OSCEs and E-OSCEs were conducted with 71 participants including final year students and house officers. Each OSCEs had 10 stations, including one interactive station in traditional OSCE. Students' scores in both the OSCEs were collected and paired t-test was used to compare the mean scores at $p<0.05$.

Results: Total number of house officers were 27 and final year students were 44. The scores of 71 participants were collected. The difference between mean scores of house officers' traditional OSCE and E-OSCE was statistically significant (p=0.000). The difference between final year students traditional OSCE and E-OSCE was also statistically significant (p=0.020). Finally, the overall difference between traditional OSCE and E-OSCE was also statistically significant (p=0.000)

Practical implication: The main objective of this study was to assess the reliability of an E-OSCE and to compare whether the electronic method of conducting OSCE is more reliable than the traditional method of conducting OSCE.

Conclusion: Despite limitations and the biases, the results of E-OSCE proved to be better than traditional OSCE. Further research needs to be conducted on E-OSCE to control the factors causing biases and limitations.

Keywords: Traditional OSCE, E-OSCE, COVID-19, methods of assessment, medical education, dental education, distance learning.

INTRODUCTION

The COVID-19 outbreak, has influenced the whole world and has affected the basic fabric of our societal construct [1]. Multiple professions have been disrupted by this pandemic; especially the health care profession, where the health care workers are providing front-line care for patients. Likewise, it has caused unprecedented disruption to medical and dental hospitals, teaching institutes and their respective faculties and students. The high rate of spread of this virus made it almost impossible to carry on one on one teaching method thus, affecting the medical and dental education system [2]. This pandemic put people's life at risk as it complicates the condition into life-threatening situations and makes it very difficult for the instructors to take lectures safely. Majority of the doctors in teaching hospitals were occupied by COVID-19 patients, thus, leading to less opportunities for house officers to complete their bedside teaching lessons and complete their house jobs [3,4] (The COVID-19 pandemic has significantly disrupted medical and dental education, including clinical rotations, which are a crucial aspect of training [5]. Many medical professionals have also expressed concern about the risk of medical students contracting the virus during their training and potentially spreading it to the community. To mitigate these risks, students have been required to stay at home and follow social distancing guidelines. These measures have disrupted traditional in-person educational models and forced schools to adapt to online learning platforms [6].

COVID-19 has had a major impact on the education and training of students, particularly those in the medical field who typically rely on in-person clinical rotations and practical exams as an important part of their studies. The pandemic presented a significant challenge in finding ways to continue delivering the course effectively while also protecting students and patients from the risk of infection [7]. As a result, new approaches to conducting clinical and practical exams had to be implemented in order to ensure the safety of everyone involved [8].

During the pandemic, the final year medical and dental students have been affected the most since the students have to take clinical examinations, requiring them to be in close proximity with multiple patients [9]. Due to the closure of medical and dental institutes, the examiners are facing multiple problems in conducting clinical assessments and examinations. Teaching and assessment methods, during the COVID-19 era have changed exceedingly; especially the way practical or clinical examinations were being conducted. Prior to COVID-19, the clinical examinations were solely traditional/live Objective Structured Clinical Examination (OSCE) but due to the implementation of quarantine and isolation protocols during this pandemic, E-OSCE method was introduced [10]. The Pakistan medical council (PMC), College of Physicians and Surgeons Pakistan (CPSP) and Royal College amongst others, started implementing virtual assessment methods to not cause any further delay to the scheduled examinations. Moreover, the students and examiners can interact and continue with their academic timetables, without further postponing their respective assessments and also following their respective isolation protocols, during this pandemic.

Aim: The main objective of this study was to assess the reliability of an E-OSCE and to compare whether the electronic method of conducting OSCE is more reliable than the traditional method of conducting OSCE.

MATERIALS AND METHODS

This was a cross-sectional study that was conducted at the Rawal Institute of Health Sciences (RIHS), Islamabad from December 2021 to April 2022. The sample size estimation was conducted prior to participant recruitment and it was calculated to be 75. House officers and final year students were included in this study and were subjected to traditional OSCE and E-OSCE with a total of 71 participants. A total of 50 stations were developed and their difficulty levels were assessed by the senior faculty members. It was then divided into two groups; Group A was for traditional OSCE stations and group B was for E-OSCE stations, group A and B were further divided into A1 and B1 for house officers and A2 and B2 for final year students. For both the OSCEs, a total of 10 stations were selected which consisted of multiple-choice questions (MCQs) and clinical scenarios. Difficulty level of both the OSCEs were kept at the same level to provide greater validity and reliability and to assess the participants on equal basis to avoid

any discrepancy but questions were different for traditional OSCE and E-OSCE. Three senior faculty members of the Orthodontics department assessed the difficulty level of the OSCEs. Only one interactive station was included in the traditional OSCE. Both the traditional OSCE and the E-OSCE were conducted in the auditorium of Rawal Institute of Health Sciences (RIHS), on the same day. Five minutes per station were allotted for both traditional OSCE and E-OSCE

Operational Definitions: OSCE is objective, structured and clinical method of assessment, in which the clinical skills and knowledge of dental students and house officers was assessed. The traditional OSCE was conducted in person and the E-OSCE was conducted online. The E-OSCE stations were presented on Microsoft Power Point and the students/house officers submitted their answers via email. All the candidates were examined using exactly the same stations with the same marking scheme.

Sampling Technique: The study used purposive sampling technique.

Inclusion Criteria: Final year students.
Dental house officers.
Both males and females.

Exclusion Criteria: Participants who were late for examination.
Participants who were absent on the day of examination.

Plan of Analysis: Students' scores from both the OSCEs were entered into Microsoft Excel custom-made data entry sheet and subjected to analysis with Statistical Package for Social Sciences (SPSS) version 23. Paired t-test was used to compare the mean scores. The chosen p-value threshold for statistical significance was set at 0.05.

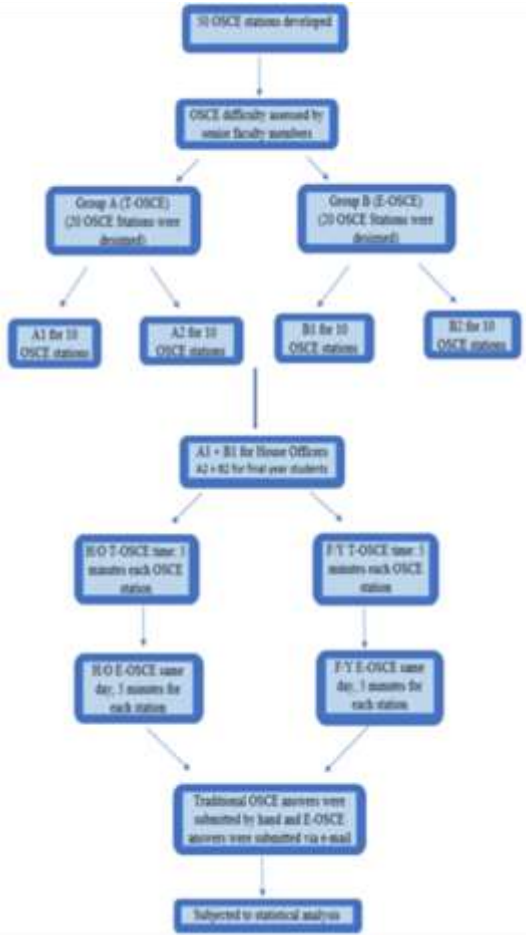

Fig 1. Flowchart of materials and methods. T-OSCE: traditional OSCE, E-OSCE: Electronic OSCE, H/O: House officers, F/Y: Final year

RESULTS

The total sample size was 71 including 27 house officers and 44 final year students of RIHS. The scores of 71 participants were collated and analyzed with SPSS (version 23). Statistically significant difference (p-value <0.05) was found between traditional OSCE and E-OSCE when paired t-test was applied. Paired t-test was also applied separately for traditional OSCE and E-OSCE scores of house officers and final year students. The main outcome of both groups were also statistically significant at p<0.05.

The mean score for house officers' traditional OSCE was 23.51±7.04 and for house officers' E-OSCE was 33.57±10.1. The results of paired t-test between house officers' traditional OSCE and E-OSCE were statistically significant (p-value=0.000). Similarly, the paired t-test results between final year students' OSCEs were also statistically significant (p-value=0.020). Mean score for final year students' traditional OSCE was 22.78±9.74 and for final year students' E-OSCE was 26.20±8.86. Finally for the combined scores of traditional OSCE and E-OSCE of both house officers and final year students, the difference of mean scores was statistically significant (p-value=0.000), Mean score for traditional OSCE was 23.09±8.65 and for E-OSCE was 29.31±10.04. The results of all three comparisons revealed that the E-OSCE scores of study participants were significantly higher than T-OSCE scores.

Table 1: Comparison of results of traditional OSCE with E-OSCE for different OSCE groups

OSCE Groups		Mean ± SD	P-value
1.	H/OTOSCE	23.51±7.04	0.000
	H/OEOSCE	33.57±10.1	
2.	F/YstTOSCE	22.78±9.74	0.020
	F/YstEOSCE	26.20±8.86	
3.	TOSCE	23.09±8.65	0.000
	EOSCE	29.31±10.04	

DISCUSSION

Since the COVID-19 pandemic had altered life in every possible manner, the normalcy of studying, teaching and conducting exams in medical and dental schools was also compromised. A new method of online distance-learning was brought about for the continuity of medical school education during the lockdown.

This study was carried out to compare the traditional (i.e., face to face or in-person) method of conducting clinical exam/OSCE, with electronic/online clinical exam/OSCE.

It has been reported that some medical schools officially cancelled formal teaching in wards and online problem-based learning (PBL) techniques were implemented instead. These methods were found favorable to the extent that they were applied in subsequent years [1]. Arekat et al. (2022), reported lowest mean scores for the ability of the online OSCE to assess clinical skills. They stated that the process is justifiable but not a perfect replacement of the in-person method involving practice of psychomotor skills [10]. Implementation of distance e-learning in medical education is challenging in developing or under-developed countries due to technology-related, institution-related, student-related barriers and lack of infrastructure like internet access and adequate speed of internet [11]. Information and Communications Technology (ICT)-linked issues such as unavailability of proper hardware, inappropriate software or their poor management, has been documented as negatively impacting the use of technology in class [12]. In another research study, students mentioned that at times there were problems of bad connectivity of internet and disconnection of Wi-Fi [13]. Current study investigators faced similar challenges in methods of conduction of E-OSCEs but these observations were not recorded formally as part of study.

The pandemic forced education stakeholders to quickly adapt to new tools that will continue to be used [12]. The pattern of E-OSCE was unknown to the students as they were unaccustomed to such software(s) prior to COVID-19 pandemic. Also, the student compliance was reduced due to E-OSCE being conducted immediately after conducting the traditional OSCE.

According to Hytönen et al., the electronic OSCE was created and arranged successfully despite the challenges related to COVID-19 and their study participants felt it was better to show their competence online than in traditional OSCE [14]. Most of the students complained that their most significant challenge during the online exam was less time and their inability to type fast as compared to manual work and assessments [13].

Strengths and Limitations: One of the strengths of this study was that both the groups being compared; traditional OSCE and E-OSCE had similar difficulty index assessed by senior faculty members. Another strength was that the research investigators remained the same for both traditional OSCE and E-OSCE to improve reliability and avoid bias. Thirdly, the study design was experimental, providing more quality evidence.

In this study, internet connectivity issue was a major drawback in E-OSCE causing disruption and delayed submission of answers ensuring possible misuse through unfair means. One of the main purposes of OSCE is for students to experience working under close observation, which was challenged due to the conduction of online mode of examination. Furthermore, this study was conducted at one institute only I.e. Rawal Institute of Health Sciences.

The sudden switch to online medical and dental E-OSCE being conducted due to the pandemic, in contrast to traditional OSCE was perceived lower in efficacy. Moreover, it was difficult to ensure learning and interaction online.

CONCLUSION

Although E-OSCE is a promising alternative to traditional OSCE especially during the COVID-19 era, there were still a lot of problems faced during the conduction of E-OSCE. Despite the limitations and the biases, the results of E-OSCE proved to be better than traditional OSCE. Further research needs to be conducted on E-OSCE to control the factors causing biases and limitations.

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