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Saudi Internal Medicine Residents' Perceptions of the Objective Structured Clinical Examination as a Formative Assessment Tool

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Abstract

The Saudi Commission for Health Specialties first implemented the Objective Structured Clinical Examinations (OSCE) as part of the final year Internal Medicine clerkship exam during the 2007–2008 academic year. This study evaluated Internal Medicine residents' overall perceptions of the OSCE as a formative assessment tool. It focused on residents' perceptions of the OSCE stations' attributes, determined the acceptability of the process, and provided feedback to enhance further development of the assessment tool. The main objective was to assess Internal Medicine resident test-takers' perceptions and acceptance of the OSCE, and to identify its strengths and weaknesses through their feedback. Sixty six residents were involved in the studied administered on November 8th 2012 at King Abdulaziz University Hospital in Jeddah, Kingdom of Saudi Arabia. Overall, resident's evaluation of the OSCE was favorable and encouraging. To this end, we recommend that formative assessment opportunities using the OSCE for providing feedback to students should be included in the curriculum, and continuing refinement and localized adaptation of OSCEs in use should be pursued by course directors and assessment personnel.

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Keywords: OSCE; Clinical competence; Postgraduate assessment; Formative and summative assessment; Feedback

1. Introduction

Appropriate assessment of resident's clinical skills and competence is of paramount importance when evaluating expected learning outcomes. Several methods of assessment of performance are used in medical education. The Objective Structured Clinical Examination (OSCE) was developed to reduce bias in the assessment of clinical competence where various aspects of clinical competence are evaluated in a comprehensive, consistent, and structured manner with close attention to the objectivity of the process. It is comprised of several stations in which examiners, using predetermined criteria, assess a variety of clinical skills on an objective-marking scheme. The number and length of stations can vary depending on the format in use. Tasks may include history taking, physical examination, patient education, test interpretation, or other activities. Some stations present part of a case or
problem using simulated standardized patients (SP). Others are unmanned, such as those for data or image interpretation. As an assessment tool, the OSCE reduces variations in marking standards from one examiner to another, eliminates the luck-of-the-draw, and can reflect the real life tasks of the doctor. Besides being objective, this technique addresses the assessment of all three domains (cognitive, affective, and psychomotor) at some point. Since its introduction as a mode of student assessment in medical school in 1975 by Harden and Gleeson, the OSCE has become a standard method of assessment for both undergraduate and postgraduate students including non medical fields. In addition, it has been used for both summative and formative assessment in various medical and paramedical disciplines. The Saudi Commission for Health Specialties has only relatively recently (2007–2008 academic year) implemented OSCE as part of the final year Internal Medicine clerkship exam. Only six stations were used in the first year of its introduction to partially cover history and physical examination as part of final residency year assessment in Internal Medicine residency programs. Currently, it is composed of a circuit of twelve stations in which various tasks are asked, including three history-taking skills stations, three physical examination stations, one communication skills station, one consultation skills station, one procedure station, and three data interpretation stations. In 2011, the first Internal Medicine OSCE course was initiated in Saudi Arabia as a formal method of assessment for the final Saudi Board of Internal Medicine Examination. It aimed at providing a forum for feedback to residents on their strengths and weakness in clinical skills and at helping them to become familiar with the format of the OSCE exam.

Published findings from literature on the OSCE since its inception in 1975 have reported it to be valid, reliable, and objective, with cost as its major drawback. It requires considerable financial resource and faculty time and effort, particularly by those more directly involved in the selection and preparation of real patients and the recruitment and training of simulated patients.

Student perception and acceptance of OSCEs have been reported to be positive in various clinical disciplines worldwide. For example, It was reassuring regarding their perception about the validity, objectivity, and overall organization of the OSCE in a Department of Pediatrics, though a good proportion expressed their concern that the examiners at some stations were intimidating. In another study, three-quarters of the students agreed that the assessment process helped to identify gaps and weaknesses in their competence. In yet another study, student midwives highlighted several points for criticism, including poor equipment and unsatisfactory administration. Reports on local experience with OSCEs on the Kingdom of Saudi Arabia are limited mainly to the surgical discipline.

None of the studies assessed the examinees’ perception of the assessment tool. It was not until early 2012 that one article highlighted students’ perceptions on the OSCE. It was conducted in a single institution in Abha.

The current study is designed to evaluate Internal Medicine residents’ overall perceptions of the OSCE as a formative assessment tool. It focuses on residents’ perceptions of the OSCE stations’ attributes and the acceptability of the process in order to provide feedback to enhance further development of the assessment process.

2. Methods

2.1. Study area/setting

The OSCE course was conducted in November 2012 at the Clinical Skills Center (CSC) of King Abdulaziz University Hospital (KAUH) in Jeddah, Saudi Arabia. KAUH-CSC is composed of three wings with 12 small rooms in each wing. Rooms are set in a U-shaped layout with an open area in the middle. This allows residents to move smoothly between rooms while an organizer sits in the middle area to coordinate the running of the exam. All rooms are equipped with patient beds and examination tables and/or diagnostic instruments, and a digital audio-visual monitoring system supplements viewing during clinical teaching and exams. Additionally, the CSC contains seven big rooms, which include high fidelity technology.

For the purpose of the OSCE course, the CSC was divided into two examination venues; each venue consisting of 12 exam stations. Orientation of examiners and residents was done in separate lecture halls. The questionnaire of the study was distributed to the residents immediately after the OSCE circuit in another selected room, and responses were collected before they left the exam venues.

2.2. OSCE design

Designing and implementing the Internal Medicine OSCE course includes: development of a blueprint
which served as a guideline; development and face-validation of the 12 stations in accordance with the blueprint; design of performance criteria and assessment instruments in the form of a structured marking schemes for individual stations; recruitment of the examiners; recruitment of the potential exam patients; recruitment and training of the simulated patients; and administration of the OSCE course. A team of clinical faculty members developed the blueprint for designing and running the OSCE. Structured marking schemes and instructions to candidates and simulated patients/actors were developed based on the tasks assigned at individual stations. However, contents of respective stations and their assessment tools were further face-validated by the course director (myself – Director of Internal Medicine Residency Program at KAMC) and two Co-directors (former Internal Medicine Program Directors at KAMC and KAUH), and other clinical faculty reviewers (various physicians) through a process of review and consensus. All three Course Directors had good experience with how OSCEs are run in an Internal Medicine program. All of the twelve participating simulated patients were given prior training to ensure the consistency of their responses. They were junior medical residents (R1, R2) who were recruited from the Internal Medicine Residency Program of King Abdulaziz University Hospital. The 36 participating faculty were all experienced clinicians who were involved in teaching and had examined in at least one prior real OSCE exam. They were given written instructions about the OSCE process and another briefing session that included specific orientation about their roles. Since two parallel circuits were conducted, the training emphasized consistency in grading and feedback formats between each pair of examiners to ensure the same scores and feedback points were given to a resident regardless of which arm he/she completed. In addition, eight medical staff member and two secretaries organized the examination. The importance of a positive atmosphere during the course was strongly emphasized, especially that the feedback should be given in a constructive manner. A staff member was asked to buzz a bell once after the 8-min exam time as a sign for the examiners to start giving feedback to the examinees. Three consecutive buzzes signaled the residents to rotate to the next station. A further 30 s was allowed for the examiner to finalize the marking scheme and for the resident to move to the next station until each candidate had visited every station. There were no rest stations. The total examination time for each resident was 136 min. The candidates were offered refreshments at the end of the OSCE exam and were given feedback forms to fill in. They were asked to wait in the feedback room while the remaining groups entered the exam area; this was done to avoid any leakage of the exam questions. A 20-min break between session was set to allow examiners and simulated patients to have a short rest. The orientation room was used to accommodate the subsequent groups of residents to be examined when the first group finished the exam.

2.3. Study subjects

The study includes all Internal Medicine residents, both male and female of Levels 3 and 4 who are involved in the Saudi Council Internal Medicine training program throughout the Kingdom and participated in the OSCE course on November 8th 2012. There was no age or gender restriction. Seventy two residents registered to take the OSCE course but only 66 appeared and participated in the six OSCE circuits on the day of the OSCE course.

2.4. Instrument

In this cross sectional study, a validated questionnaire with various domains, modified from a study by Pierre et al. in 200412 was employed and administered immediately after all residents complete the OSCE stations. Experienced faculty members and educators did the face-validation of the questionnaire, and a consensus was established.

The questionnaire is comprised of demographic data of the residents and questions to evaluate their perceptions of the nature, content, structure, and organization of the OSCE; quality of performance and objectivity of the OSCE process; and perceptions of OSCE validity and reliability. In addition, open-ended follow-up questions were included to generate qualitative data on perceived strengths and weaknesses of the OSCE course and residents' recommendations for improvement.
A 5-point Likert-type scale that indicates degrees of agreement was used to assess most of the dimensions in the questionnaire, where Strongly Agree (SA) = 5, Agree (A) = 4, Neutral (N) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1. Residents were asked to complete the questionnaire on a voluntary basis immediately after finishing the OSCE, before leaving the examination venue. They were apprised of the valuable contribution they could make towards improving this formative assessment tool. They were also assured that information they provide would remain confidential and their identity would not be disclosed; and if they chose not to participate; they would not be pressured to do so. Instant collection of the completed responses took place at the feedback room of the course venue.

2.5. Data analysis

The data were entered and analyzed using SPSS version 21. Descriptive statistics are presented as frequencies and percentages for categorical variables (e.g. gender, nationality, city of training), and numerical variables (e.g. age) are presented in the form of means and standard deviation. Basic descriptive statistical analysis of the Likert items was conducted by calculating means and standard deviations. The 32 items of the questionnaire were divided into six main themes based on the content of the items. Then a mean and standard deviation was calculated from each theme. Factor analysis could not be attempted as the response-to-items ratio was approximately double. This was not done due to the fear of instability of data and inappropriate conclusions for the open-ended questions, the qualitative data was analyzed manually using thematic content analysis.

3. Results

The survey was conducted in November 2012 on Saudi residents of “Internal Medicine Residency Programs” throughout the kingdom. The reliability on all questions was 0.83. The questionnaire had face validity however construct validity could not be ascertained. Out of 66 eligible medical residents, 65 completed the self-administered questionnaire representing 98.5% (65/66) of those who completed the OSCE course. The mean age was 30.7 years, 43(66%) males and most them were R4 97% (63/65), only 2 (3%) were R3. 24 (37%) residents were trained in Jeddah, 15 (23%) in Riyadh while the rest had their training in different areas of the kingdom including Makka, Madina, Taif Dammam, Abha, Tabuk, and Buraidah.

3.1. OSCE attributes

Generally, medical residents’ feedback about OSCE attributes was positive (Table 1) with an average score range between 2.3 and 4.5. The highest mean of agreement was 4.5 for the OSCE administration and the way it was structured as well as that the staff were helpful in guiding the students through the process of OSCE. The means of level of satisfaction that OSCE covered a wide range of knowledge it also covered a wide range of clinical skills are 4.3 and 4.1 respectively. Interestingly, OSCE was considered as a stressful assessment tool with mean of agreement of 3.5 and a mean of 2.3 that it is intimidating.

3.2. Environment set up

Evaluation of the environment set up was positive in all of its aspects (Table 2). The residents were highly satisfied with the room temperature with a mean of 4.5. However, space, environment being free of noise and light had a mean of 4.4 each.

Table 1
| Internal medicine residents’ perception toward OSCE attributes. |
|------------------|------------------|
| Question | Score | Mean SD |
| The exam was well administered | 4.5 | 0.6 |
| The exam was well-structured | 4.5 | 0.6 |
| Wide knowledge area covered | 4.2 | 0.7 |
| Wide range of clinical skills covered | 4.1 | 0.8 |
| The staff were helpful in guiding us through the process of OSCE | 4.5 | 0.6 |
| OSCE was stressful | 3.5 | 1.1 |
| OSCE is an intimidating assessment method | 2.3 | 0.9 |

*Mean score on a 5 point scale (Strongly agree=5, strongly disagree=1).*

*SD=Standard deviation.*

Table 2
| Internal medicine residents’ attitude toward OSCE environment set up. |
|------------------|------------------|
| Question | Score | Mean SD |
| Adequate space | 4.4 | 0.6 |
| Environment was noise free | 4.4 | 0.9 |
| The light was adequate | 4.4 | 0.8 |
| Temperature is comfortable | 4.5 | 0.6 |
3.3. Quality of performance

In term of Quality of Performance (Table 3), the mean satisfaction ranged from 4.0 to 4.4. The highest level of satisfaction was about the instructions given for the OSCE with mean of 4.4, then, the fairness of tasks to be performed and the logic of sequence of stations with mean of 4.3 each, while the clearness of instruction scored a mean of 4.2. The mean level of satisfaction about the adequacy of the time allocated at each station was 4.1. There items scored mean of 4, namely, the tasks given in the OSCE reflect skills learned in the residency, the awareness of OSCE nature and the authenticity of settings and contexts of stations.

3.4. OSCE educational impact

The residents highly perceived OSCE as a useful learning experience with valuable Educational Impacts (Table 4). In evaluating the OSCE course, the mean satisfaction ranged between 4.1 and 4.5. The highest mean was 4.5 that it helped in preparing for final OSCE exams and a mean of 4.4 that it highlighted areas of weakness in both skills and knowledge. While it was considered as an opportunity to learn real life scenario with mean of 4.3. In addition, the residents felt that it will even help them in passing the final exam and improving their confidence with mean of 4.2 each. The lowest mean was 4.1 that the OSCE course helped them in alleviating the stress in the real exam.

3.5. Feedback quality

In regards of the feedback evaluation (Table 5), the residents were satisfied with the supportive attitude of the examiner and considered the feedback given as effective with mean of 4.3. Although the feedback highlighted areas of weakness as perceived by the residents with a mean of 4, the mean satisfaction dropped to 3.7 about the time allocated for feedback.

3.6. OSCE reliability and validity as perceived by the residents

Perception about the reliability and validity of the OSCE varies among the residents (Table 6). The mean of agreement about the OSCE as a practical and useful experience was 4.4, followed by, the scores were standardized with mean of 4.1. However, the person-
ality and gender of the examinee can affect the score has mean of agreement 3.7. The lowest mean of agreement about the OSCE is 3.5 that passing or failing the exam may not reflect their actual clinical skills.

3.7. Perception’s dimensions

The overall mean of level of residents’ agreement about perception’s dimensions of the questionnaire ranged from 3.9 to 4.4 (Fig. 1). The highest mean of satisfaction 4.4 is about the environment set up, followed by OSCE educational impact with mean of 4.3, then, quality of performance. The feedback quality scored an overall mean of 4. While the lowest mean of satisfaction was for OSCE attributes as well as OSCE reliability and validity as perceived by the residents with mean of 3.9.

3.8. Residents' responses to open-ended questions

Three open-ended questions were asked regarding the strengths, weaknesses, and recommendations for improvement of the formative OSCE. Interpretable responses were categorized into themes. Overall residents’ responses were favorable toward the OSCE course. Most of the residents (95%) would like to recommend the OSCE course to their colleagues. They appreciated the encouraging learning environment (10 comments)

“Environment was friendly (all coordinators and organizers) and Instructions were clear”.

Regarding the other strengths of the OSCE course, residents’ reaffirmed that the OSCE highlighted their area of weaknesses in clinical skills and knowledge (20 comments)

“It helped me to live the experience before the real exam and know the week and strong points on me”.

Fifteen residents commented that it provided them with authentic experience

“It helps me to give a clear picture about real exam station”

Other stated that it would help them in preparing for the exam (14 comments)

“The exam will help me in organizing my preparation for the exam”

“It will help me for my coming clinical exam”.

Some residents indicated that the opportunity for feedback helped to direct their learning process (15 comment)

“It was very useful & I learned a lot from feedback in both knowledge part & technical points of OSCE”.

Others felt that the time allocated for feedback was not enough (11 comments)

“Some examiner didn’t have a good time to give a full feedback”

Two of the residents commented on some technical problems included unclear instruction or image in the data interpretation station.

“Communication station (Prof Hadrami station) has vague instruction

“The copy of data interpretation (CT brain) was not good”.

Suggestions for improvement included increasing the time for feedback (11 comments)

“Give more time for feedback and may be some to illustrate at least the finding”.

![Fig. 1. The overall mean score of perception's domains.](image-url)
Residents strongly recommended that the future OSCE courses have broader coverage of competencies and to include more stations (14 comments).

“Increase the number of stations to cover most of the area”

Eleven requested to conduct the OSCE course more frequently prior to the exam.

“I wish to make it more than once per year”

A few residents requested to include this assessment tool as part of the curriculum to guide them in their learning. They suggested that the Saudi council should support such courses and encourage its implementation on regular bases.

“Advice the Saudi council to support the resident in preparing such a great course”

Residents’ responses to open-end questions are shown in the appendix

4. Discussion

In our study Saudi Internal Medicine residents showed an excellent degree of acceptance of the Objective Structured Clinical Examination. This was demonstrated by the positive responses concerning structure, fairness, comprehensiveness, authenticity, and objectivity of this assessment tool. The findings are congruent with previous studies on OSCEs in the medical literature. However, a good proportion of residents expressed concerns that the gender and the personality of the examiners might be a source of bias that affected their scores/performance in the examination. But, in spite of this, a similar proportion of them agreed that their performance on the examination was a true reflection of their clinical skills, seemingly invalidating their previous contention that gender of the examiners was a true source of bias.

The finding that an overwhelming proportion of the residents agreed that the OSCE course provided a useful and practical learning experience was consistent with similar studies reported elsewhere. While they appreciated the learning experience, many residents found it a stressful process even though not counting for a grade. This finding may reflect their inexperience with the format of the OSCE, as the majority believed that attending the OSCE course would help in alleviating the stress during the subsequent actual OSCE exam. Several studies have documented that the OSCE can be an anxiety-producing experience and that the level of anxiety changes little as student’s progress through the examination. This type of stress may be perceived as an advantage, since actual clinical practice is also carried out under stress. Reasons cited for students’ reported difficulties with stress control are multiple. In one study, a possible explanation was that it became very embarrassing when student expertizes in analyzing a clinical situation was assessed by an observer inside the room. The presence of an observer created a stressful situation. Yet, in another study, students expressed a major concern that the time allocated for performance was inadequate.

Interestingly, although residents found the OSCE a stressful experience, they disagreed that it was an intimidating process. This may be explained by the positive atmosphere that we emphasized during implementation of the OSCE.

In our survey residents showed high satisfaction for the time allocated for stations, in contrast to the reported responses given by students of other medical disciplines. This reaction may be explained partially by the fact that in our course, the time allocated to perform each task was fixed among all stations and effort was made to make it best fitted to the most complex task in order achieve the best authenticity possible.

The OSCE course provided residents with a feedback mechanism to measure their strength and weaknesses in clinical skills. It was given immediately after each station where the individual resident reviewed the correct answer with the faculty member. The time allocated for feedback was three minutes. The faculty members also used this time to answer residents' questions and give advice on how to study for this exam. They also focus on the OSCE format and logistics. Immediate feedback during the OSCE has been studied and actually has been shown to be successful in improving performance and was welcomed by the participating participants. It was found to be valuable both as a learning and teaching experience. It improves students’ competency in the performance of clinical skills at subsequent stations and provides them with valuable self-assessment that can stimulate further learning. Like in the previous studies, residents here desired more feedback on their evaluation as a means to guide learning. They report that they appreciated the opportunity to have constructive discussions of their strengths and weaknesses in clinical encounters, and the practice for future OSCE-type examinations. However, they expressed their concerns about the inadequate time given for the examiners’ feedback regarding their performance. This is similar to the concerns raised by students in a
previous study. Students at Newcastle had said that without adequate feedback, assessment could not be effectively used as a tool to inform the learning process.25

In terms of administration of the OSCE, we reached a good level of organization with some difficulties, and a cooperative and team-working environment was perceived during the process. The organization of OSCEs is complex and time-consuming especially when many stations are to be used. Two residents pointed to the high cost of the OSCE course, a well-known drawback of this assessment tool. In fact, most of the criticism against OSCEs has centered around their high cost. In our study, it was not possible to calculate the exact cost. However, it is important to highlight that it required additional effort from the faculties and additional time for its design and application. Initial reports, primarily from medical literature, on OSCE costs have provided very disparate data, ranging from a low of $11 per participant, to a high of $1200 per participant. Low-cost reports are often limited in their expense reporting process.29 The excellent attendance to the course despite its high cost indicates the high demand. In addition, the high residents' response rate has helped to ensure that the findings presented are a valid representation of resident opinion.

4.1. Limitations of the study

The cross sectional design of this study gives us an insight into resident perceptions only at one point in time and didn't include the examiners' views of the process, which could add further invaluable feedback to improve and refine the current assessment tool.

4.2. Directions for future research

There are continuing needs for research on the OSCE, future step is a factor analysis for objective subdivision of the categories of the questionnaire, especially if with a greater number of respondents. Further study can be conducted to identify the predictive validity of the preparatory OSCE course. This may be done by correlating the results of residents' grades with their grades in the summative OSCE (final Saudi Board OSCE exam). This project could add further academic rigor to the assessment of the resident skills.

In conclusion, implementation of the formative OSCE for the Department of Internal Medicine Residency program in the Kingdom of Saudi Arabia has been challenging. However both residents' acceptance of the process and their participation in the evaluation have been encouraging. Their feedback is regarded by designers as a key indicator for successful organization and implementation of the OSCE course and also provides an impulse for better improvement.

To this end, we recommend formative assessment opportunities using the OSCE. Student feedback on the OSCE should be included in the curriculum of all residency programs and continuing refinement, and localized adaptation of OSCEs to contextual use should be pursued by course directors and assessment personnel.

Disclosure

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None.

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