



Different Assessment Tools for Evaluating Objective Structured Clinical Examinations in Medical Education: A Rapid Review

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Abstract

In the last three decades, the Objective Structured Clinical Examination (OSCE) has seen exponential growth in usage in undergraduate and postgraduate examinations worldwide. This review aims to identify the different assessment tools for objective structured clinical examinations, as well as the advantages and disadvantages of tools in medical education. The results of the review showed that the most well-known type of test in the family of objective structured tests is the OSCE.

However, although the general and basic principles of OSC are the same, the way of conducting the test or the applied field is sometimes so different that the examiners prefer to use other names for these tests, such as OSCA, USNLE, iOSCE, OSATS, OSVE, TOSCE, OSPE, OSLE, and OSTE. The results showed that this multiplicity of nomenclature may be unnecessary except for a few cases, such as OSVE and TOSCE, which have specific structural differences from the original OSCE. For the rest of the cases, the same OSCE can be used. Each assessment tool has advantages and limitations, and there is no assessment method to obtain a comprehensive picture of student performance. For a comprehensive evaluation of the ability level of a student, multiple tools should be used longitudinally instead of a single tool.

Key Words: Evaluation, OSCE, Objective Structured Clinical Examination, Medical Education, Tools.

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1- INTRODUCTION

In medical sciences, the Objective Structured Clinical Examination (OSCE) is an evaluation method that has gained significant popularity in the last few years and is used in various courses and disciplines to measure the practical and clinical competence of students. This exam consists of several stations that students pass, in order. In each station and during a fixed time, students must perform a specific clinical task, such as taking a history or performing an examination or a procedure before a standard patient, mannequin, or model. During this time, the examiner positioned at the station directly observes the student's performance and evaluates them according to pre-compiled checklists (1-3).

In this test, students demonstrate their knowledge and skills in a simulated environment, and their readiness to face the real environment can be measured (4, 5). Most clinical professors believe that this test reflects the students' performance better than the traditional tests (6-9). OSCE is a modern examination often used for assessment in health care disciplines (10). In the last three decades, the OSCE has seen a steady exponential growth in usage in worldwide undergraduate and postgraduate examinations. The OSCE is also used for licensure examinations and as a feedback tool in formative settings. Common uses of the OSCE are listed below:

- As a performance-based assessment tool for testing the minimum expected standards of students or trainees as barrier (exit) examinations during the undergraduate years in most medical schools,
- As a postgraduate high-stakes assessment tool in Royal College examinations,
- As a formative assessment tool in undergraduate medical education,

- As a tool for the assessment of graduates seeking high-stakes licensure and certification to practice medicine, and
- As an educational tool to provide immediate feedback (11-14).

OSCE consists of several stations that students pass, in order. In each station, they usually perform a specific task under the supervision of an examiner and are evaluated (12, 13). Even though the general and basic principles of OSCE are the same, the way of conducting the test or the applied field is sometimes so different that the examiners prefer to use other names for these tests (15-26).

This review aimed to identify the different assessment tools for evaluating the Objective structured clinical examinations (OSCEs), as well as the advantages and disadvantages of tools in medical education.

2- MATERIALS AND METHODS

In this review, Web of Science, Scopus, ProQuest, PubMed, ERIC, SID, Magiran, CIVILICA, and Google Scholar search engine were searched using English and Persian keywords with no time restrictions (up to July 10, 2023) to find related articles. The full texts of related studies were reviewed, and their main results were extracted. Similar results were categorized and presented descriptively. The search was done independently and in duplication by two reviewers, and any disagreement between the reviews was resolved by the supervisor.

3-RESULTS

1. Types of objective structured clinical examinations

The most well-known type of test in this family is the OSCE. Simply put, OSCE consists of several stations that students pass, in order, and in each, they usually perform a specific task under the

supervision of an examiner and are evaluated. Although the general and basic principles of OSCE are the same, there is no standard and uniform structure for holding OSCE. Each college and institution does this according to its own rules, and usually, there are differences in the number and times of the stations, the number of examiners, and other criteria (12-16). Sometimes, the way of holding the exam or its field of application is so different that the examiners prefer to use other names for these exams, including the following:

1-1. Objective Structured Clinical Assessment (OSCA)

This test was first proposed by the Royal Australian College of Surgeons in 1990 and has been modified frequently. In general, the number of stations in this test is lower (less than five), and the duration of each station is longer (about 15 to 20 minutes). What the students face at the station is not a specific skill, but they are in full contact with a patient and must show several abilities at the same time. The content of these stations is integrated and includes communication skills, history, examination, recording and summarizing data, clinical reasoning, and preparing a diagnostic treatment plan (27, 28). A similar test is used in the clinical skills (CS) section of the United States Medical Licensing Examination (USMLE) exam. Although this tool seems very similar to OSCE, some prefer to distinguish it using another name. One study with a similar experience at the University of Taiwan on an objective structured test named it iOSCE, i.e., integrated OSCE. This test included two clinical cases presented in the form of five related stations, and the examiners evaluated the student's performance in different areas (15, 16). Undergraduate programs often use OSCAs to assess this knowledge and determine student competency (29). OSCAs have been used

to assess medical students since the mid-1970s and have become a popular tool for assessing the clinical competency of nurses in the past two decades (30).

1-2. Objective Structured Assessment of Technical Skill (OSATS)

This test was developed by the University of Toronto in 1990 to assess procedural and technical skills and provide feedback to residents, especially in surgical fields. The residents had to go through several stations, where they were asked to perform procedures such as sutures, open surgery, or laparoscopy within a certain time (usually 15 to 20 minutes). The examiners at the station observed the residents' performance and evaluated them based on the checklist and with global scoring (18-20). The checklist was used to evaluate each step of the desired technique or procedure and had items scored as one and zero. The basis of this test was the use of animal models and simulation of real conditions, but several articles have also been published that presented OSATS experience in the operating room (21).

1-3. Objective Structured Video Exam (OSVE)

This test is designed to evaluate students' communication skills in an economical and practical way. Since communication skills are variable in dealing with different patients, a proper evaluation of these skills requires a large number of encounters, that is, the number of stations, increasing the cost of OSCE. In OSVE, students are presented with several recorded videos of a doctor's encounters with patients and are asked to answer a number of written questions (closed or open answer) about the communication that took place. This test can be applied in the classroom environment and does not require special and expensive arrangements. Some studies have tried to identify and evaluate hidden scripts from students' overt behavior through special questions and correction

methods (31, 32). Despite the name similarity, this method can be considered a written test rather than a clinical one (16).

1-4. Team Objective Structured Clinical Examination (TOSCE)

This test was developed concerning the importance and necessity of teamwork and inter-professional cooperation. The scenario is designed and implemented involving a team of four to five students working together, and each one has a specific task in taking care of the patient. The examiners observe the performance and, at the end, provide feedback on their interaction and clinical and professional skills (33, 23, 22). Some researchers have conducted a similar test but under the name of Group Objective Structured Examination (GOSCE) (24, 34).

1-5. Objective Structured Practical Examination (OSPE) or Objective Structured Laboratory Examination (OSLE)

This test is designed for areas such as laboratory or practical work of basic science courses, where the student performs practical skills but does not necessarily face the patient and clinical work. For example, the stations of this exam include tissue observation under the microscope, peripheral blood slide preparation, bacterial slide staining, and biochemical tests (16, 35, 36).

1-6. Objective Structured Teaching Exercise (OSTE)

This tool is related to the educational abilities of professors (and assistants). Although it can evaluate academic staff members, it includes more feedback and practice in empowerment programs and is used to strengthen the educational skills of faculty members. Since it is not common for other teachers and educational professionals to observe a teacher's instruction, OSTE provides a good opportunity for this. This test consists of

several stations, each with an educational scenario, and instead of the patient, a standardized student plays a role in the station (37-39).

2. Advantages and Limitations of Objective Structured Clinical Examinations

No evaluation method is perfect. Each of the tools to measure students' knowledge, skills, and abilities has advantages and limitations that make them suitable for use under specific conditions. One good approach to making a decision about a tool is to compare its advantages and limitations with other tools (16).

2-1. Advantages of Objective Structured Clinical Examinations

- Ability to evaluate a variety of skills in an environment similar to the real environment,
- More objectivity than most assessment tools,
- The variety of examiners, reducing bias,
- The same questions and exam conditions for all students,
- The positive attitude of learners and professors towards it,
- Motivating students to learn, and
- High reliability and validity (16, 40-46).

2-2. Limitations of Objective Structured Clinical Examinations

Due to the mentioned advantages, some have considered OSCE as the gold standard for evaluating learners in health and medicine. However, today, it is clear that not all of these advantages apply to all OSCE. For example, the validity and reliability of OSCE is not a fixed value, and depends on the questions, examiners, test conditions, and many other factors and must be checked every time the test is performed (40). On the other hand, the

following issues have been raised as OSCE problems in texts and articles:

- Although students have a good acceptance of OSCE, the stress and anxiety imposed on them in OSCE is undeniable and can affect their performance. Nevertheless, some authors believe that this stress indicates the high validity of the test because facing patients in a real environment can also be stressful.
- The OSCE test is expensive and requires a lot of facilities and equipment. Issues such as test security or equating parallel stations add to its complexity. In addition, faculty members should spend a long time designing and implementing the test.
- Another issue similar to the cost is the possibility to run the test. For example, access to real or standardized patients is not easy and requires careful planning. Especially for OSCE held in a particular section, such as children, using children for a long time is problematic and affects their cooperation.
- Another problem is the simulated environment in OSCE, which can affect the performance of students and prevent them from showing the same behavior in OSCE for a certain skill as they do in the real environment.
- A similar point to the previous limitation is that some skills with an important role in functioning in the real environment, e.g., cooperation in teamwork, management, resources, and leadership ability, are not easily measured by OSCE.
- Another limitation of OSCE is the absence of a holistic view when evaluating ability. It is believed that breaking the ability to care for the patient as an interwoven whole into separate components is not desirable

and reduces the validity of the instrument. Separating the competence into its components is due to the inability of OSCE to assess all skills and because skills assessed in the OSCE cannot be measured by other instruments such as written or computer-based tests. In this regard, OSCE questions are designed not based on learner's knowledge or understanding of its application. For example, if the question designer wants to evaluate the overall ability in the Pap smear test, they will design a station that only measures the student's practical skill in performing the test, while the indication of the test and how to interpret it are other important things that shape this ability in general. However, they are not included in OSCE because they can probably be evaluated in written tests (16, 21, 27, 40-47).

4- DISCUSSION

This review aimed to identify the different tools for the assessment of objective structured clinical examinations in medical education. The most well-known test in this family is the OSCE. However, sometimes the examination method or its applied field is so different that the examiners prefer to use other names for them, such as OSCA, USNLE, iOSCE, OSATS, OSVE, TOSCE, OSPE, OSLE, and OSTE (12-21, 27-39).

Patricio et al. have pointed out that this multiplicity of names may be unnecessary except for a few cases, such as OSVE and TOSCE, which have clear structural differences with the primary OSCE, and for the rest of the cases, the same OSCE may be used (26). OSCE has significant strengths, but its possible limitations and problems should also be considered. Also, the validity and reliability of the test are particularly important, especially if OSCE scores and results are used for important-

decisions (16). Although OSCE is an effective method for evaluating the clinical competence of medical students, it has several implementation problems due to limitations such as requiring experienced human resources, training people as standardized patients, resources, and facilities, and being time-consuming. In addition, detailed planning, training of professors, designers, and supervisors, a suitable location and measurement tools, and the necessary facilities for each station are required for its greater success (48, 49). Nowadays, evaluating the clinical competence of learners is of extreme importance and gives society confidence that the graduated learners have the necessary qualities to practice medicine and care for patients. The General Medical Council emphasizes the importance of an accurate assessment of clinical competence. It is not possible to measure the clinical and practical skills and qualifications of students in the exam hall and in the form of regular paper tests, and it is necessary to provide special conditions to make this work possible (16).

In Miller's pyramid, the upper two levels refer to comprehensive clinical practice (**Figure 1**). Traditionally, the tests used to measure the level of "show-how" were long and short cases. Along with the benefits of these tools, there have always

been criticisms. These exams did not have a clear and standard structure, the number of clinical cases presented to each student was small, the clinical cases of different students were different, and the students were evaluated by different evaluators in a way that allowed for subjective evaluation with no basis in specified criteria (11, 16). The above tests are still used to evaluate the level of show-how, but OSCE was introduced in response to their limitations and to reduce sources of measurement error (10). The distinctive feature of OSCE is that a single test is held for all students at a certain time with the same grading, and since the student shows their skills in a simulated situation, the conditions are more comfortable and controlled than in the real environment (17).

In recent decades, OSCE has been used in many studies to measure the clinical abilities of medical students (50-59). Despite the popularity and widespread use of OSCE, this test alone cannot fully show the student's competence. No evaluation method can be used to obtain a comprehensive picture of the student's performance, but several aspects of clinical competence can be measured by OSCE. Therefore, it is recommended to obtain a comprehensive opinion about the ability level of a student by using multiple tools longitudinally (16, 60).



Fig.1: Miller's Pyramid of Clinical Competence*.

*Miller GE. The assessment of clinical skills/competence/performance. Acad Med 1990;65(Suppl):S63-7.

5- CONCLUSION

Nowadays, evaluating the clinical competence of learners is considerably important and gives society confidence that the graduated learners have the necessary competence to practice medicine and care for patients. During the last three decades, OSCEs have been used extensively to evaluate the clinical competence of students. The most well-known type in the family of objective structured clinical examinations is the OSCE. However, the exam or the applied area is sometimes so different that the examiners prefer to use other names for these exams, such as OSCA, USNLE, iOSCE, OSATS, OSVE, TOSCE, OSPE, OSLE, and OSTE.

A review study suggested that this multiplicity of names may not be necessary except for a few cases, such as OSVE and TOSCE, which have specific structural differences with the primary OSCE, and the same OSCE can be used for the rest of the cases. Despite the popularity and widespread use of ASCII, this test alone cannot fully show the student's competence. No evaluation method can be used to get a comprehensive picture of the student's performance, but several aspects of clinical competence can be measured by OSCE. Therefore, it is recommended to use multiple tools longitudinally to obtain a comprehensive opinion about the ability level of a student.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: MA and BF; Data analyzing and draft manuscript preparation: SM, SI, NA, and HS; Critical revision of the paper: MA; Supervision of the research: MA and BF; Final approval of the version to be published: MA, SI, SM, HS, and BF.

7- CONFLICT OF INTEREST: None.

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