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Review

How to Design and Apply an Objective Structured Clinical Examination (OSCE) in Medical Education?

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ABSTRACT

The Objective Structured Clinical Examination (OSCE) is considered a gold standard summative and formative assessment method wherein it is a comprehensive and standardized tool assessing the clinical competencies including psychomotor domain, attitudes, and behaviors that will be manifested in the real work of the medical graduates. Therefore, the implementation of OSCE depends on the design of a blueprint that consists of two axes; the first axis is the tested competencies according to the learning objectives while the second axis represents a system or problem that is related to these competencies. Thus, the blueprint of OSCE is a translation for the learning objectives into clinical competences such as history taking, physical examination, radiographic and laboratory data interpretation, technical skills, attitudinal behaviors, and counseling skills. In addition, the utility index proved that OSCE has a good balance for acceptability, reliability, validity, credibility, feasibility, cost, and educational impact. However, the use of OSCE for the students' assessment is considered expensive and exhausted because it requires many facilities, a great deal of the personnel besides the needed consuming time for its application.

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1. INTRODUCTION

Practical clinical training and assessment of the medical student should be closely matched. Therefore, the use of the real environment or authentic situation for the learning and the assessment of medical competence are essential to promote the learning because the learning within a relevant context enables the medical students to store and retrieve the knowledge in a better way [1].

It is known that Miller classified the medical competence into four levels or categories such as knows, knows how, shows how and does. So, it should be a necessity to organize a comprehensive and standardized tool

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(examination) to assess the medical student for the levels of shows how and does assessing the clinical competencies in the psychomotor domain, attitudes, and behaviors that will be manifested in the real work of the medical graduates. This tool or examination that was created in the last years is called an objective structured clinical examination (OSCE) that is considered as an alternative to the unstructured clinical observations. So, it can assess content skills, process skills, and clinical management wherein it evaluates clinical competence of the student in history taking, physical examination, and technical procedures [2].

Furthermore, OSCE is considered a gold standard summative and formative assessment method of clinical skills. It gives feedback to the student (formative) for the learning and practices before the summative assessment that is a suitable method to assess the performance of the students via creating the clinical situations via using simulation technology to decrease the variables and clarify the objectives besides it limits the complexity [3].

Noteworthy, OSCE is designed for clinical and theoretical knowledge application wherein the theoretical knowledge is required with the standardized questions. Furthermore, it is considered an objective exam because it is based on using the same stations and the same assessment checklist in the student evaluation to enable the student to get marks for every performed step. In addition, it is also considered a structured exam because it depends on providing the designed specific tasks that cover all curriculums for all students with specific instructions. So, the name of the objective structured clinical examination (OSCE) is derived from the composition of its elements [4].

Furthermore, the success of OSCE application in medical education results from specific measurements such as validity, reliability, feasibility, and credibility those were essential factors in the evaluation of its performance. The validity of OSCE includes content validity "a good sampling of matching skills with the learning outcomes", predictive validity, and concurrent validity to measure what it was designed to measure while the reliability measures the consistency of OSCE. In addition, the evaluation of OSCE performance includes also the item analysis to test the difficulty of every station related to the overall exam. Moreover, the grading of OSCE may also depend on a criterion-referenced system, norm-referenced system, or both [5].

Therefore, OSCE is considered a valid and reliable exam. In more detail, OSCE can increase the reliability of measurement because the student moves through many stations to perform a task in each station wherein his performance is scored by an examiner using a checklist or rating scale. Noteworthy, the use of detailed checklists in OSCE may decrease inter-rater unreliability and then reinforces the reliability because the test results depend on the direct observation and the repeated measurements that help the examiner to assess many different qualitative aspects such as efficiency and the student skill performance. It is also considered valid test or exam because it depends on multifactor such as the blueprinting, the scoring system, and the standardized criteria besides authenticity that is considered an essential and contributing factor for the validity [6].

2. WHAT IS THE OSCE?

OSCE consists of multiple short stations containing a wide sampling of clinical and communication skills with a large number of the involved examiners and the standardized or real patients within a limited time via using a structured measurement method such as a specific checklist or global rating scale. Therefore, OSCE includes a broad spectrum of the clinical tests such as the standardized patient or the real patient examination, review of radiographs, multiple-choice written questions and the use of models or manikins for testing the technical skills that are valued tests but it is restricted to the thoughts of examiners [7].

It should like to mention here that the short stations in OSCE enable the medical student to achieve a large number of different stations in the available testing time. In addition, the large number of examiners and patients who involve in the different stations of OSCE may also limit the bias to a large extent. However, there is another point of view which says that the use of short stations in OSCE may be destructive to the validity of the test because it does not allow assessment other aspects of shows how level such as the ability of students to deal with complicated situations that need the integrated different skills such as decision making, drawing the conclusions based on physical examination and investigation, and management skills of the case. Thus, the use of short stations should be limited to technical skills only. On another hand, the use of long stations as an alternative is also controversial because it may affect the reliability of the testing according to the opinions of some medical educators. On the opposite side, some experts refuse this direction indicating that the station length has a limited influence on the reliability. Therefore, I think that the best is using a balanced content during determining the assessment task apart from the controversial views to ensure the authenticity and the efficiency of measurement [8].

3. HOW TO ORGANIZE AND APPLY THE OSCE?

Initially, a structured and organized committee or organization must be formed with specific responsibilities for administering OSCE from the design to implementation. This committee will be responsible for the determination of content, reliability, validity, and the implementation of OSCE with assigning an examination coordinator who will coordinate between the different activities of OSCE during the implementation [9].

Secondly, responsible teamwork should design a blueprint of OSCE which should consist of two axes; the first axis is the tested competencies according to the learning objectives of the educational course or module while the second axis represents a system or problem that is related to these competencies. Thirdly, the blueprint should translate into definite skills, behaviors, and attitudes that will be assessed by the examiners based on the learning objectives through clinical competence assessment in history taking, physical examination, radiographic and laboratory data interpretation, technical skills, attitudinal behaviors, and counseling skills [10]. An illustrated example is shown in Table 1.

Fourthly, the stations of OSCE and its number should be determined according to the tested skills and behaviors wherein the total number is 10-12 at least besides a design and preparation of the questions of examination for the critical thinking assessment based on the differential diagnosis and management of the case. In addition, the time of the station and the time in-between the stations and the length of the examination should also be determined [11]. Furthermore, the profile or characters of every station should be identified including the status of station whatever dynamic or static, and the title or condition that is presented in the station such as a case of ischemic heart disease which should correspond with the domain and competence tested, and the needed or the estimated time for performing the task. Moreover, the station profile should also include the specification of the most suitable tool for the demonstration of the skill whatever the real or standardized patient, mannequin, or virtual siting. In the related context, well-prepared scenarios for all stations should be designed via using the language of the patient without any medical terms or redundant detail providing enough information to guide the student to perform the required task [12].

Fifthly, the scoring criteria of the assessment should be prepared for every station wherever all stations should have one set of the total marks, let it be ten or twenty; it should also be short, clear, and reliable including the helpful instructions to the examiners. The most commonly used is the checklist that divides the performance of required task into practical, objective, and specific steps or procedures wherein every step is scored by a mark. We would like to mention that some steps which are related to ethics, general consideration, attitude, and behavior, it should not be given a high score as this will affect the overall score of the exam [13]. Worthwhile, the rating in the checklist is useful for unqualified or inexperienced examiners because the scoring is not done or done. There is another scoring form may also be used such as the rating scale that is like the checklist wherein the examiner differentiate the performance based on the quality and the level of mastery via a scale consisting of satisfactory, borderline, weak, unsatisfactory (not done) that are assigned by a mark for every level in the scale such as 2, 1.5, 1, 0. The global rating is considered another type that can be used with both the checklist and the rating scale. It assesses the overall performance of the student to differentiate the competent from incompetent. In this type of rating, the examiner gives the student a global judgment such as pass, borderline, or fail. Moreover, the global rating may also be used for the standard-setting in the borderline group. In addition, we would like to mention the construction of the marking scheme should be depending on discrimination actions to distinguish between good and poor performance [14].

Last but not least, some logistic procedures should be achieved along with a preparation of the needed facilities

Table 1. OSCE Blueprint of the Respiratory Module

Tested Competency Of OSCE	History Taking	Physical Exam	Diagnosis	Procedures	Communication Skills and Counseling	Management of Clinical Cases
System Or Program Or Health Problem	Chest diseases	Chest exam	Chest X ray	Equipment (Nebulizer, inhaler, Peak Expiratory Flow Meter)	Health Education and Counseling For the patient of infectious chest diseases	Cases of Chest diseases

OSCE: Objective Structured Clinical Examination

before the delivery of exam such as allocating the place of examination, determination of the manikins and the standardized patients that will be used in OSCE stations with creating the instructions that are related to every station, identification the examination stations circuit and assigning of the examiners [15].

Noteworthy, the preparation of instructions is considered essential for the examiner, patient and student wherein it should outline the required task exactly at every station for the student and outline the marking scheme instructions about the action and performance of the student at every station for the examiner and then it should outline the dealing approach between the standardized or real patient and the student. Moreover, it should remind that the instructions of examiners should be simple and sharp according to the scientific, logistic and legal rules of the exam such as put the student at ease, observe the performance of the student and interact with him without chatting and do not give the student any feedback [16]. Furthermore, the instructions of the student should also be clear, and placed inside and outside the station such as switch off your mobile during the exam, read and follow the instructions of every station carefully and do not discuss with your colleagues during the changing of the stations. Regard the standardized patient instructions, it should also include some important points such as behave kindly with the student, listen to the student carefully, present your problem in a consistent and reliable manner, respond to the student questions appropriately according to the given designed scenario and respond to the unknown questions that are out of the scenario by using no or I don't know [17].

In addition, the preparation of resources such as examination rooms, manikins, and other facilities should be done along with performing orientation sessions for examiners, standardized patients, and volunteers. In the related context, it should also evaluate the exam after finishing it to detect mistakes and work to avoid them in the future. Therefore and based on the above mentioned, it is noticed that the use of OSCE for the students' assessment is considered expensive and exhausted because of the need to many facilities and the consuming time that is needed to achieve it besides it requires also a great deal of the personnel for its application [18].

Finally, we would like to mention that the feasibility of OSCE stations should be investigated by verification of some important points such as is the task authentic? "Student can perform it", pilot the duration of the station" it should be deciding the duration of the station before the exam, is the duration of station suitable for performing the intended task?" matching the clinical stations closely as possible as and equipment checking [19].

4. ACTUALLY, IS OSCE CONSIDERED A GOOD ASSESSMENT INSTRUMENT?

Briefly, to get an answer to the above-mentioned question, it should mention the utility index of OSCE that depends fundamentally on specific characters determining the extent of the proficiency and success of any assessment instrument. In more detail, we can say that OSCE has many characters of good assessment instruments because of its objectivity that minimizes the given chance to the examiners to manipulate the questions, answers, responses, performance, and judgment. Moreover, it has also validity whatever face, content, construct or predictive besides the reliability wherein it has repeatability and reproducibility or consistency along with objectivity and validity that also improve the reliability. There is also acceptability for this exam because every student does the same task. In addition, OSCE has also a high educational impact because it enables students to learn more in-depth. Therefore and on based the above-mentioned criteria, we can also confirm that all components of the utility index come true for OSEC to be a good assessment tool because it has a clear balance for acceptability, reliability, validity, feasibility, educational impact besides the cost [20].

5. CONCLUSIONS

The objective structured clinical examination (OSCE) consists of a broad spectrum of clinical tests (stations) such as the real or standardized patient examination, review of radiographs, multiple-choice written questions or technical skills by using manikins. OSCE has many characters of good assessment instruments such as objectivity, validity whatever face, content, construct or predictive besides the reliability. It has also acceptability, credibility, feasibility, and high educational impact leading to its proficiency and success.

6. DECLARATION OF CONFLICTING INTERESTS

The Author declares that there is no conflict of interest.

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