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IMPLEMENTATION OF AN OSCE AT KAOHSIUNG MEDICAL UNIVERSITY*

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The Objective Structured Clinical Examination (OSCE), a tool to objectively and fairly assess medical students' clinical competences, has become widely used in medical education worldwide. However, most medical schools in Taiwan have just begun to adopt this assessment method. In 2003, Kaohsiung Medical University (KMU) established the first standardized patient (SP) program in Taiwan and applied SPs with an OSCE. This study reports the process of the implementation of an OSCE at KMU, which includes collecting information, visiting leading clinical skills centers, consulting medical educators from other countries, holding international conferences, establishing an OSCE committee, writing cases, training SPs, administrating the OSCE, and receiving feedback from medical students. Most students were satisfied with the assessment and appreciated the learning experience. Based on the experience in 2003, the OSCE committee decided to incorporate the OSCE into the medical curriculum as a measure to assess medical students' clinical competences. In addition to assessing medical students' clinical competence, the OSCE can also be applied to other professional health education, such as dentistry, nursing, and pharmacy. We are currently sharing our experience with other colleges at KMU.

Key Words: assessment, clinical competence, Objective Structured Clinical Examination, standardized patients

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Medical students' clinical competences are traditionally assessed based on written examinations, oral examinations, and direct observation of their performance, although these procedures have their own

limits. Written examinations can be used to test students' knowledge of clinical and procedural skills, but over-reliance on this method may lead students to focus on memorizing these skills instead of practicing them [1]. Oral examinations are based on a limited number of patient cases that the students encounter, and usually have an unstructured process. The variability of the cases and the student–examiner interactions can result in unfairness [2,3]. Observation may be unreliable if the staff are too busy to constantly observe and assess students' performance, or if there

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are no common standards [4]. The Objective Structured Clinical Examination (OSCE) was therefore developed in the 1970s to improve the effectiveness of the assessment [5].

The OSCE consists of a series of exam stations where observation is conducted with students' performance of specific clinical skills, such as taking a patient history, doing a physical exam, interpreting an image or laboratory result, or performing a clinical procedure [2,6]. The patients (standardized patients, SPs) with whom the students interact are lay people specially trained to portray specific patient roles. The actor-patient in an exam station gives verbal and behavioral responses consistently to each student to provide him/her with the same clinical experience [7]. Faculty observers mark students' performance by using a case-specific checklist, which contains well-defined standards of the skills that students should demonstrate in that specific station [8]. As an OSCE can be used to assess a wide variety of clinical skills, it can provide the teachers with a reliable and general view of a student's competences [9,10].

Using an OSCE to assess clinical competences requires extensive resources such as personnel and facilities, funding, support from the faculty, the administrative authority, and students [9,11]. Therefore, it is essential to carefully develop an OSCE program in order to implement it successfully in a medical school that has no such previous program. This study describes the experience of implementing an OSCE at the College of Medicine, Kaohsiung Medical University (KMU).

DEVELOPMENT OF KMU OSCE PROGRAM

KMU runs 7-year undergraduate-entry and 5-year graduate-entry medical entry programs. Apart from the premedical courses for undergraduate-entry students in the first 2 years, the curriculum is the same for all students. The curriculum consists of 2 years of basic and clinical medical science courses, 2 years of clinical clerkships, and 1 year of rotating internship. The pedagogic methods used at KMU include lectures, discussions, problem-based learning (PBL), lab sections, and clinical training. The assessment methods used are written examinations, oral examinations, and direct observation of their performance. On completing the curriculum, each medical graduate

needs to pass the National License Examination before he or she is qualified to practice medicine [12].

The Taiwan Medical Accreditation Council (TMAC), which is responsible for accrediting medical schools in Taiwan, stresses the importance of evaluating students' clinical skills, attitudes, communication skills, and professionalism with a consistent, effective and credible standard [13]. In its accreditation reports on Taiwanese medical schools, the TMAC expressed concern about over-reliance on written examinations to assess medical students. Written examinations generally place more emphasis on the students' knowledge base and thereby fail to assess students' attitude and clinical skills. Therefore, to conduct a holistic assessment of students' competences, a plan was devised to introduce the OSCE into the medical curriculum at KMU.

Using the OSCE to assess medical students' clinical competences was quite a new concept in Taiwan at the beginning of the 21st century. Although the OSCE was widely adopted in medical education in many countries [14–16], only two medical schools in Taiwan had introduced this assessment method into their medical programs at that time. Acknowledging the importance of assessing medical students' clinical competences objectively, the author (KML) proposed the establishment of a clinical skills center (CSC) and an OSCE program based on his experience at the University of Arkansas for Medical Science (Little Rock, AK, USA). The proposal received strong support from the President of KMU and the Dean of KMU Medical College (CHH), as well as a 2 years funding from the Ministry of Education (MOE), Taiwan. The President appointed the author (YSH) as the OSCE director.

In May 2002, Mark Swartz from the Morchard Center, Mount Sinai School of Medicine, USA, was invited to introduce "the use of SPs in medical education" for medical educators in Taiwan. His lectures had resulted in a surge of interest in this method and thus reassured our determination to adopt it at KMU.

To acquire more firsthand information about the planning of a CSC and the establishment and application of the OSCE and SP programs, the authors and some colleagues visited several leading CSCs at medical schools in the UK, the US, and Australia. They also paid special attention to the relationship between their OSCEs and integrated medical curricula. The differences between the OSCE designs at these schools were illustrated in a previous article [17].

Apart from visiting CSCs, with the grant from the MOE, we invited medical educators from abroad to give lectures and workshops on how to implement the OSCE and SP programs. To invite experts to visit Taiwan, the author posted a call for help, and received responses from subscribers of DR-ED@LIST.MSU.EDU. Many CSC directors were willing to assist us in developing the program, among them was Gail Furman from the Saint Louis University (SLU) School of Medicine, USA. In addition to giving lectures, she shared the cases and checklists used at SLU, and trained seven medical students to demonstrate how to train SPs and the use of SP–student interview in teaching communication skills. The faculty at KMU then used these as a blueprint to develop cases of our own.

In 2003 and 2004, we held four conferences on clinical skills assessment and medical education. Medical educators from the US, the UK, and other countries in Asia were invited to share their experience in developing and using OSCEs and SPs at their schools. The faculty and students of KMU, along with the other medical schools in Taiwan, have greatly benefited from the lectures and workshops, which provided them with a holistic view of the OSCE and SP programs (Appendix 1).

In 2003, we set up an OSCE committee to develop cases and checklists, recruit and train SPs, and organize the OSCE. The committee decided to conduct a pilot OSCE with the 1st year clerkship students, targeting their skills in history taking and communication. The OSCE would be a formative evaluation and would provide feedback for improvement; it would not be incorporated into the final grade. With students' clerkship experience in mind, clinicians in the committee wrote cases, and developed checklists based on the blueprint provided by Furman. The committee discussed and reviewed the draft cases, and adapted eight of them, which included cases of internal medicine, surgery, obstetrics/gynecology, pediatrics, neurology, and orthopedics.

To recruit SPs, advertisements were posted in the University hospital and online. Many medical students, patients, and staff members were interested in participating in the program. The OSCE director held an orientation meeting and explained the nature of being an SP. SP candidates were interviewed by one of the committee members, and those suitable for the roles were trained by case writers. Each case writer trained the SPs of his/her case on how to portray the

patient's role, how to complete the evaluation checklist, and how to provide feedback according to the blueprint provided by Furman.

THE OSCE DESIGN

The OSCE consisted of eight stations, with two to three SPs and one faculty observer for each station. The SPs took turns to be the patient, and when not in the patient role, he/she would observe the interview. The committee decided to use a Group Objective Structured Clinical Examination (GOSCE) approach, which was similar to the Team Objective Structured Clinical Examination (TOSCE) [18]. Groups of students went through the eight exam stations, undertaking the role of the doctor in turns. One student in the group interacted with the SP directly to obtain a focused history for 12 minutes, and then the other students in the same group had 3 minutes to ask additional questions. Subsequently, the students would leave the station for 5 minutes, while SPs and the faculty observer completed the checklist, and then they would return to receive feedback from the SPs and the observer for another 5 minutes. The student–patient interviews were videotaped, and each faculty observer gave their comments on students' overall performance at the end of the examination.

First year clerkship students who were to take part in the pilot OSCE had been asked to attend the lectures and demonstrations by guest speakers. Before the exam, the OSCE director also held an orientation for students to introduce the exam, and sample checklists were given to students in advance so that they could familiarize themselves with the requirements.

Due to the severe acute respiratory syndrome (SARS) epidemic in the spring of 2003, the OSCE committee decided not to use the clinic rooms in the University hospital. Instead, the lecture hall was used. Screens were set up to separate the eight stations; since the students' main task was history taking and not physical examination, no beds or other special equipment were required. Students were asked to wear their white coats and to bring their stethoscopes.

The 1st OSCE was piloted on volunteers from the 1st year clerkship students in April 2003. Groups of two or three students went through the procedures as stated above. The other 1st year clerkship students who did

not take the 1st OSCE were asked to join the 2nd OSCE in May 2003. On this occasion, five or six students were in one group. Due to the heavy load of their clinical responsibilities, most of the faculty observers were not able to complete the whole examination procedures: some were only able to participate on the first or the second day of the examination, so sometimes there were only faculty observers in half of the stations

(Table 1). As a result, the degree of satisfaction of the students with the 2nd OSCE was lower than that of those with the 1st OSCE (Table 2).

EVALUATION OF THE OSCE

Student perception

A questionnaire was conducted at the end of each administration of the OSCE, and the students were asked to evaluate seven aspects of the examination: exam content; exam environment; exam atmosphere; the performance of the SPs; feedback from the faculty; the improvement in their own clinical skills as they progressed through the exam; and their overall satisfaction with the exam. The response rates were 78% (14/18) and 95% (173/182), respectively. Most (80% or more) of the students indicated that they were satisfied or very satisfied with all aspects evaluated except the environment (Table 2). Approximately one-third of the

Table 1. Comparison between 1st and 2nd OSCE

	1 st OSCE (April 19, 2003)	2 nd OSCE (May 8–9, 2003)
Number of students	18	182
Students per group	2–3	5–6
SPs per station	2–3	2
Faculty observers per station	1	0–1

OSCE = Objective Structured Clinical Examination; SPs = standardized patients.

Table 2. Students' satisfaction with the OSCE

	Very much satisfied, <i>n</i> (%)	Satisfied, <i>n</i> (%)	Neutral, <i>n</i> (%)	Dissatisfied, <i>n</i> (%)	Very much dissatisfied, <i>n</i> (%)	No response to question, <i>n</i> (%)
1. Exam contents						
1 st OSCE (<i>n</i> = 14)	8 (57)	6 (43)	0 (0)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	41 (24)	106 (61)	23 (13)	2 (1)	1 (1)	0 (0)
2. Exam environment						
1 st OSCE (<i>n</i> = 14)	6 (43)	4 (29)	4 (29)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	38 (22)	71 (41)	55 (32)	6 (3)	2 (1)	1 (1)
3. Exam atmosphere						
1 st OSCE (<i>n</i> = 14)	7 (50)	6 (43)	1 (7)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	46 (27)	102 (59)	17 (10)	7 (4)	1 (1)	0 (0)
4. SP performance						
1 st OSCE (<i>n</i> = 14)	10 (71)	4 (29)	0 (0)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	69 (40)	88 (51)	12 (7)	2 (1)	1 (1)	1 (1)
5. Faculty feedback						
1 st OSCE (<i>n</i> = 14)	10 (71)	4 (29)	0 (0)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	62 (36)	94 (54)	10 (6)	5 (3)	1 (1)	1 (1)
6. Improvement in clinical skills after the exam						
1 st OSCE (<i>n</i> = 14)	10 (71)	4 (29)	0 (0)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	34 (20)	109 (63)	27 (16)	2 (1)	1 (1)	0 (0)
7. Overall satisfaction with the exam						
1 st OSCE (<i>n</i> = 14)	7 (50)	7 (50)	0 (0)	0 (0)	0 (0)	0 (0)
2 nd OSCE (<i>n</i> = 173)	38 (22)	111 (64)	21 (12)	1 (1)	2 (1)	0 (0)

OSCE = Objective Structured Clinical Examination; *n* = number of students answering the questionnaire.

students indicated that the interference of sounds from the other stations in the lecture hall were a distraction. The problems of using a lecture hall as an exam space have therefore been resolved after the new CSC was established in Spring 2004.

Some students gave written comments on the OSCE. Regarding the exam content, they suggested that physical examination and different types of case problems be added, such as patients with mental disorders, SARS, etc.

Most students indicated that the SPs acted like real patients, though a few of the SPs could not memorize the script very well. A few SPs were too eager to give students hints, and would interrupt the students or give more information than were asked. The SPs' performance was later improved after more training by the case writers.

Faculty members are often so busy that, during clerkship rounds, they do not have time to observe students' performance and give immediate feedback. Many students therefore appreciated the opportunity to practice their clinical skills, and to receive feedback about the strengths and weaknesses of their performance from faculty members directly.

The students also proposed some specific suggestions. For example, they suggested that the number of students in one group be decreased, so that every student can have the chance to practice more. Some students had originally thought that their tasks were to make a diagnosis, and were disappointed to find that they were merely asked to take patients' history and communicate with the patients. In addition to orientation meetings, they suggested that the committee post the information about the OSCE online, especially details of the OSCE process, schedule and requirements. The students also wished to watch videos explaining the OSCE in advance. A few students reported that the OSCE could be used at the end of each clerkship, which would be a more interesting and objective test than the current assessment methods.

SP questionnaire and results

We also distributed a questionnaire to SPs shortly after the end of the OSCE. The questionnaire included semi-structured questions about their reasons for joining the SP program, and their opinions on students' performance. The responses of SPs are summarized in Appendix 2. Both students and patients stated that being a SP was a worthwhile experience.

DISCUSSION

Although two other medical schools in Taiwan had used the OSCE program as an assessment method about the same time when the KMU OSCE program was being developed, KMU was the first medical school that used a layperson to role-play a patient. One of the two medical schools used senior medical residents as SPs to evaluate its medical students' clinical competence [19]. The residents wrote the patient cases and played the patient's role. The advantages of using residents as SPs are that residents can give students instructions and constructive feedback from a professional point of view. Other reasons for using residents as SPs are that maintaining an SP program is resource demanding, and people in Taiwan are usually too reserved to participate in such an innovative program. However, the disadvantages of using residents as SPs probably outnumber the advantages. For instance, students are not likely to view their teachers as patients, and sometimes can even guess what the case problem might be judging from the resident's specialty. It is also a problem if there are personality conflicts between the students and residents when working together. This may produce a bias when the resident is grading the student.

The results of our questionnaire also indicated that the incentive of people who participate in this program is more for helping medical students rather than for the reward, as the hourly pay was lower than that of a part-time job at McDonald's. One of our SPs had more than eight surgeries in recent years, which made him an expert on being a patient, and he and his wife were eager to share their views on patients with the students. Senior clerkship students were willing to help the learning of the juniors even though they had heavy workloads, and they thought that being SPs were also a good learning experience for themselves. An advantage of using laypersons in our experience is that students generally would avoid using medical terms when communicating with patients. They would also use Taiwanese (a dialect in Taiwan) to communicate with those who could not speak or understand Mandarin.

Our OSCE was the joint effort of the clinicians who devised the cases and trained the SPs, the faculty members who manned the stations, and above all, the SPs, who did a remarkable job. The students who participated in the first two OSCEs also provided

invaluable comments and suggestions. Based on the experience in 2003, the OSCE committee decided to incorporate the OSCE as a formative assessment into the Clinical Diagnosis Practice course for 4th year medical students from 2004 onwards. And in 2005, KMU implemented a new 3rd and 4th year curriculum composed of 15 organ-system blocks, in which a set of minimally required clinical competences were integrated into related blocks [20,21]. The OSCE and SP were suggested to be the most suitable method to assess half of the clinical skills listed [21].

To provide a better environment to conduct OSCEs, the 6W floor of the University hospital, which used to be ward, was refurbished as the CSC in spring 2004. There are 12 examination rooms and one observation/control room in the CSC. Students and faculty can use the examination rooms for various purposes, such as PBL sessions, teaching, practice, and evaluation of clinical skills, and the reviewing of videotapes or DVDs of students' OSCE performance.

The objective of medical education is to produce excellent medical professionals. To achieve this objective, KMU wishes to provide a well-rounded training program which emphasizes students' clinical skills, communication skills, altruism, and attitudes as much as their medical knowledge. To assess such clinical competences, KMU introduced and implemented the OSCE. It is important to organize and plan the OSCE carefully to ensure that the strength of this assessment method can be achieved [22]. In this study, we described the process of establishing an OSCE program at KMU that had no previous experience in the OSCE. As the OSCE is now widely used to assess clinical competences of students in medical education [23,24], as well as in other professional health education such as dentistry [9,25], nursing [26,27], pharmacy [28,29], physiotherapy [30], and radiation therapy [31], we are currently sharing our experience with the other colleges at KMU.

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Appendix 1. Themes of lectures on the OSCE and SP programs

1. Teaching clinical skills and assessment.
2. The multiple roles of the OSCE in the medical school curriculum.
3. The use of SPs in medical education.
4. Organizing and running an OSCE.
5. Writing SP cases.
6. Designing and creating checklists and task sheets.
7. Finding and training SPs.
8. Selecting the case mix for an OSCE.
9. Student orientation on OSCE test day.
10. Providing feedback for students and SPs.
11. Financial considerations in setting up an OSCE.
12. Standard setting for clinical skill assessment.
13. The OSCE score in the overall medical school evaluation.
14. The OSCE in certification examination.
15. Clinical skills center.

Appendix 2. SPs' motivation and their opinions of students' performance

Q1. Why did you join the SP program?

Medical students:

1. I thought this experience could give me a chance to understand patient's feelings and thoughts.
2. I could improve my understanding of what information should have been obtained by a physician.
3. I could improve my history taking and communication skills.
4. I was interested in the SP program and medical education in general, and thought this would be an interesting and meaningful experience.

Hospital staff, patients, and others:

1. I thought it would be very educational and would benefit both students and patients.
2. This would be a chance to help medical students develop their history taking and communication skills.
3. I was a volunteer in KMU hospital, and I was very happy to join this program.

Q2. In your opinion as an SP, what and where did the student do well in the physician-patient interactions?

Medical students:

1. As the students rotated through the eight stations, they became more experienced and performed better than the previous groups.
2. They were polite and friendly.
3. They cared for the patients and listened to them attentively.
4. Their attitudes were good, and I hope they will use the same attitudes when they face real patients.

Hospital staff, patients, and others:

1. Most of the students were friendly when taking a case history, and they were able to elicit the patient's problem.
2. The students were very cautious.
3. They learned fast, and their skills improved perceptibly in a very short period of time.
4. The students were knowledgeable and patient.

Q3. In your opinion as an SP, what and where did the student need to improve in the physician-patient interactions?

KMU students:

1. The students should think of themselves as doctors, and they should be more confident and encouraging.
2. Their thoughts should be more organized when asking questions and abstracting patient history.
3. They need to be compassionate.
4. They need to improve their knowledge and need more experience to apply the knowledge adequately.

Hospital staff, patients, and others:

1. The students were nervous and unorganized. They focused on the patient's problem and cared little about their feeling in the first few stations, but they improved as they got used to the exam format.
2. Some students need to improve their attitudes and skills, and show more compassion, friendliness, and courtesy. They need better communication skills, and their questioning needs to be more organized for abstracting patient's history.
3. Some students could not speak Taiwanese fluently; if they could communicate in Taiwanese, the physician-patient interactions would be friendlier.

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客觀結構式臨床測驗 (OSCE) 是一種能客觀且公平地評量醫學生臨床技能的評量工具，目前廣泛應用於世界各國的醫學教育。然而，台灣大部分的醫學院才剛開始採用 OSCE 來評量學生能力。高雄醫學大學在 2003 年建立了台灣第一個標準化病人計劃，並且將標準化病人應用於 OSCE。此文章敘述本校實行 OSCE 的過程，從資料收集、參觀國外臨床技能中心、諮詢外國醫學教育專家、舉辦國際研討會、設立 OSCE 委員會、編寫個案及訓練標準化病人，到實際實施 OSCE 及調查學生意見。大部分學生對於測驗感到滿意，並覺得這是很好的學習經驗。基於本次經驗，OSCE 委員會決定採用 OSCE 做為評估醫學生臨床能力的方法之一。OSCE 除了廣用於評量醫學生之外，亦被用於評量牙醫系、護理系、藥學系等醫學相關科系的學生，因此我們將醫學系實施 OSCE 的經驗推廣至本校其他科系。

關鍵詞：評量，臨床技能，客觀結構式臨床測驗，標準化病人

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