

ASSESSMENT/EVALUATION

Use of Video-Projected Structured Clinical Examination (ViPSCE) Instead of the Traditional Oral (Viva) Examination in the Assessment of Final Year Medical Students

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ABSTRACT **Context & Background:** *Assessment of medical students using the traditional oral (viva) system has been marred by being highly subjective, non-structured, and biased. The use of the objective structured clinical examination (OSCE) would circumvent these disadvantages. The OSCE is, however, costly and time-consuming particularly if used for assessment of large numbers of students. The need for another form of examination that enjoys the advantages of the OSCE while avoiding its disadvantages in the face of limited resources has been the inspiration behind this innovative approach.*

Objectives: *(1) To identify the characteristics of the new Video-Projected Structured Clinical Examination (ViPSCE). (2) To compare the acceptability of ViPSCE and OSCE by students and tutors. (3) To compare the time-effectiveness of ViPSCE and OSCE.*

Methods: *We used a slide video projection to assess the surgical knowledge, problem solving and management abilities of 112 final year medical students at Alazhari University, Khartoum, Sudan. Students completed evaluation forms at the end of the examination.*

Results: *The administration of the ViPSCE was smooth and straightforward. Feedback of the students showed that they preferred the ViPSCE to both traditional oral (viva) examination and OSCE. The examination time was 2 hours using video projection compared to the 6 hours that it used to take a class of 112 students to complete a classical OSCE.*

Conclusion: *The ViPSCE is a better replacement for the traditional oral exam. It is much less time-consuming than traditional OSCE.*

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KEYWORDS *Video-projected structured clinical examination (ViPSCE), objective structured clinical examination (OSCE), oral (Viva) exam, methods of assessment of medical students.*

Introduction

In a traditional oral (viva) examination, two examiners assess the student's factual knowledge and problem solving abilities for about 20 minutes in a face-to-face discussion. The examination is usually conducted in an office. This oral or viva assessment has several weaknesses. The number of questions (subject sample) is usually small and does not cover the spectrum of the subject (Cuschieri *et al.*, 1979). The questions are usually different for each student to avoid between-student communication. All these factors make it luck dependent (Matsell *et al.*, 1991) and lower its reliability (Cohen *et al.*, 1990). Moreover, the questions are usually not structured and the marking system is difficult to standardize. The net result is a high possibility of subjectivity and bias (Roberts & Norman, 1990). Many students find the stress of confrontation distracting and distressing. All these disadvantages may be obviated by employing the objective structured clinical examination (OSCE) instead of the traditional oral exam to test knowledge, problem-solving, and management abilities.

The OSCE has enjoyed a lot of popularity since its introduction in 1975 by Harden, who used it instead of the clinical exam (Harden *et al.*, 1975). Later, Cuschieri described its use along with long cases in the clinical examination of final year medical students in surgery (Cuschieri *et al.*, 1979). Because of its validity and reliability, the OSCE has since been increasingly used for assessment at various medical and nursing institutions, both at under- and post-graduate levels (Cohen *et al.*, 1990; Roberts & Norman, 1990; Famuyiwa *et al.*, 1991; Matsell *et al.*, 1991).

The OSCE, however, is not without drawbacks. In the conventional OSCE, students rotate round a series of (15–20) stations. At each station a component of clinical competence is tested. Some stations test skills while others test another aspect such as knowledge, and/or problem solving, etc. The stations are marked by tutors, who observe each candidate's performance and score it on pre-made checklists. This approach, however, requires a lot of preparation (Harden *et al.*, 1975; Cuschieri *et al.*, 1979), a large number of examiners, and more than one venue for examination, particularly when a large number of students are examined (Cohen *et al.*, 1990). Such arrangements are usually time-consuming and quite costly (Cohen *et al.*, 1990). Medical schools with limited resources would either not be able to conduct the OSCE or use it with extreme difficulties.

As in many other medical schools, nationally and internationally, the traditional final year examination in surgery at Alazhary University, Sudan,

involves written papers, clinical and oral (viva) examinations. The written papers include one with problem-solving questions and a multiple-choice question (MCQ) exam. The clinical examination involves hospital bedside assessment of students' clinical skills (history-taking, physical examination, problem solving and management) using actual patients. The format of this exam is divided into short and long cases.

In order to achieve the objectives of the OSCE and avoid its drawbacks with our limited facilities in Sudan, an innovative approach was tried. Since skills were not the focus of the assessment, the particulars of the examination, instead of being displayed on benches or stations, were displayed on a large screen as a slide show via a video projector using a PowerPoint computer program. Students sat comfortably and answered the questions on prepared question sheets. The computer program allowed 3 minutes per slide. At the end of the examination, the students filled evaluation forms.

Material and methods

Pre-exam Planning

Departmental meetings were held to develop examination plans. Consultants in different surgical specialties were requested to provide materials relevant to their specialty. These materials included X-rays, instruments, and photographs of patients, together with questions and model answers.

The components of the final year exam in surgery included written papers with problem-solving questions and multiple-choice questions (MCQs), the ViPSCE (instead of a viva) and a clinical examination. The marks for the written papers, ViPSCE, and clinical exam were respectively: 40, 10, and 50 (total 100). Since the ViPSCE final mark was 10, it was decided that its total mark would be 100. Twenty (20) slides would be used, each scoring 5 marks.

The aim of the ViPSCE, as in a traditional oral (viva) exam, was to assess knowledge, problem solving and management ability of students. Clinical skills, such as history taking and physical examination, were assessed by the clinical exam. This latter exam is usually conducted in a hospital set-up and involves actual patients.

The ViPSCE covered a large spectrum of the surgical field. Twelve questions were on general surgery, two questions on orthopaedics, two on urology, two on pediatric surgery, and a couple more on anaesthesia. The slides on general surgery covered both emergency and elective surgery. They also covered general topics as well as special systems, such as the respiratory and gastrointestinal systems. There were questions testing pure knowledge, such as slide No. 1 that displayed a normal saline intravenous bag. The question accompanying this slide asked the students to enumerate

two indications and three complications of its use. Other questions tested identification ability in addition to knowledge, such as slide No. 2 that showed a Sengstaken-Blakemore tube. The accompanying question asked the students to name the object, mention the indication, and enumerate two complications of its use. Problem solving ability was tested by questions such as used in slide No. 3. This was a chest X-ray showing haemo-pneumothorax. The accompanying statement was: "Examine this chest X-ray of a patient who had a road traffic accident." The students were asked three questions: (1) What is the diagnosis? (2) Mention one cause of death if the condition is not treated. (3) What is the definitive treatment?

Preparation of ViPSCE Paper-work

The ViPSCE questions-answer sheet (Figure 1) and the model answers were prepared. The scoring of the examination and the weight of each component of the question were clearly defined in the answer sheet. An evaluation form was also prepared to get students' feedback on this new ViPSCE (Figure 2).

Photographing and Computer Sessions

We used a digital camera to make the slides. The photographs were then transferred to a personal computer. The examination was prepared as a computer slide show using a PowerPoint program. The examination program started with a short introduction. This included certain instructions and information on what the examinee would see. This was followed by the examination slides. There were 20 slides. Slide time was 3 minutes. Total examination time was therefore an hour. The display of the slides was continuous. However, the last slide which displayed the word (END) allowed 3 minutes for revision. It thanked the students and asked them to fill the evaluation form.

Rehearsal of the ViPSCE

The surgical team rehearsed the examination in the hall where the real exam was to take place. The rehearsal was useful to check whether or not the slides were clearly visible, the time per slide adequate, and seating comfortable.

Administering the ViPSCE Exam (Figure 3)

The 112 students were divided into two groups and examined one after the other making sure that students did not communicate information on the way in and out of the examination hall. Those with short sight were instructed to sit in the front rows. The farthest (10th) row was about 10 metres from the screen. The administration of the examination was straightforward. At the end, answer sheets were collected and evaluation forms distributed.

AL AZHARI UNIVERSITY
FACULTY of MEDICINE- DEPARTMENT of SURGERY
Final Medical Year Video-Projected Structured Clinical Examination (ViPSCE)
April 2002

Name: ...

Number: ...

Q1: This is 0.9% Sodium Chloride solution.

1. Enumerate (2) indications of the use of this solution. (2 marks)

(i)

(ii)

2. Enumerate (3) complications of its use. (3 marks)

(i)

(ii)

(iii)

Q2:

1. Name this Object. (2 marks)

2. What is the indication of its use? (1 mark)

3. Enumerate (2) complications. (2 marks)

(i)

(ii)

Q3: Examine the chest x-ray of this patient who had a road traffic accident.

1. What is the diagnosis? (2 marks)

2. Mention the cause of death if the condition is untreated. (1 mark)

3. What is the definitive treatment? (1 mark)

Figure 1. First page of the ‘Questions–Answers’ Sheet.

Results

A. Characteristics of the ViPSCE in Surgery

Table 1 and the accompanying histogram show the results of 112 students in the ViPSCE. The marks were normally distributed. They ranged from 59 to 98 out

**Al Azhari University - Department of Surgery
ViPSCE 2002 Evaluation Form**

Thank you for taking a few minutes to answer the following questions. You will help us evaluate and improve this ViPSCE exam

1. Compared to Oral exam I think that the ViPSCE exam is:

Better ! worse Not different

Why?

2. Compared to OSCE in other subjects, the surgical ViPSCE arrangement is:

Better ! worse Not different

Why?

3. The presentation was: Very good ! Good ! Bad !

4. The seating and room were: comfortable ! Not comfortable !

5. The slides were: very clear ! clear ! Not clear !

6. The questions were: Very easy ! Easy ! Reasonable ! Difficult!
Very difficult !

7. The time for each slide was: Enough ! Too short ! Too long !

8. Would you recommend this way of examination? Yes ! No !

9. Any further comments or suggestions! (Please continue on the back of the paper).

Figure 2. Evaluation form.

of a hundred. Table 2 shows the means and standard deviation of each of the ViPSCE, written papers and the clinical exam. The ViPSCE marks for students correlated well with their marks in the paper ($r=0.7$) and poorly with the results of their clinical examination ($r=0.36$).

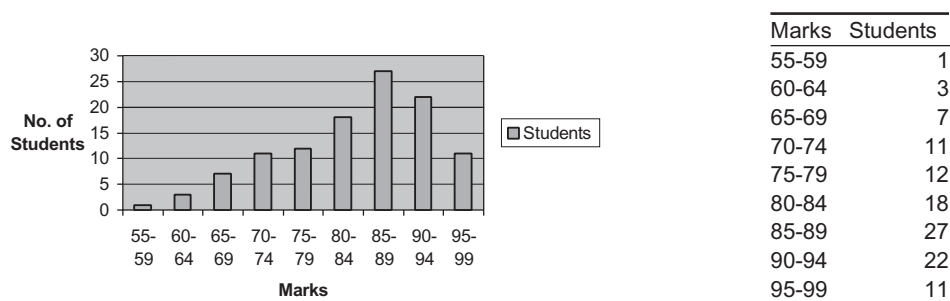
B. Students' Evaluation of the ViPSCE

One hundred and eleven (111) evaluation papers were returned out of 112 (99.1% response rate). The majority (102) of the students welcomed the ViPSCE and recommended it (91.9%). Only four students (3.6%) thought the ViPSCE was worse than the oral examination, and 5 (4.5%) saw no difference between them. The majority (102 students = 91.9%), however, stated that the ViPSCE was better than the oral (viva). They listed the following advantages: its fairness, objectivity and limitation of examiners' bias. It was thought to be less stressful than the oral exam, since it did not involve confrontation especially with unfamiliar examiners. It covered a broad spectrum of the curriculum, and it was relevant to the practice in the hospital. On expressing their views on the slide show approach of ViPSCE compared to the OSCE



Figure 3. Administration of ViPSCE: Slide showing Sengstaken-Blakemore tube. Students answer the questions in the 'Questions–Answers' sheet.

Table 1. Histogram. Distribution of ViPSCE in Surgery Marks of 112 Final Year Medical Students.



stations' approach, which was the practice in other medical school subjects, 76 (68.5%) thought it was better, 17 (15%) thought it was worse, and 9 (16.5%)

Table 2. The mean and standard deviation of the various exams in surgery.

Exam	Mean	Standard Deviation
ViPSCE (100)	82.90	9.40
Paper (40)	24.70	4.20
Clinical (50)	32.16	5.50
Total (100)	65.25	8.95

saw no difference. Those who thought it was better, found the movement and rotation involved in the OSCE distracting. They stated that movements interrupted thinking and wasted valuable time. Some of the students found the slide show method introduced by the ViPSCE more comfortable and better organized. Others liked it, because it used technology that made it attractive and more interesting. Those who expressed views against the slide show stated that they preferred holding the instruments in question in their hands rather than seeing them on a screen. The majority 107 (96.3%) liked the presentation stating it was very good (55.8%) or good (40.5%). Eighty-three students (74.8%) thought the slides were either clear or very clear. Two contrast X-rays of the common bile duct (ERCP and T-tube) were not clear enough, and X-ray boxes were used to display the originals. One hundred and two students (91.9%) were comfortable in their seating. Regarding the difficulty of the ViPSCE questions, 79 students (71%) thought the questions were reasonable, 4 (3.6%) claimed they were very difficult, 15 (13.5%) difficult, 12 (10.8%) easy and 1 (0.9%) very easy. Eight-six students (77.5%) thought there was enough time to answer the questions. Some of the 23 students (20.7%) who thought it was too short demanded more time for questions on management. Two more students (1.8%) stated that the time was enough for some questions and too short for others. We got useful feedback comments, such as size of the photographed objects, use a bigger screen, reduce the light to improve viewing and improve our catering facilities.

C. Examiners' views on the ViPSCE

The examiners were familiar with the OSCE stations' method, but they had no prior experience with the slide show approach. Concern was expressed over the visibility of slides and preventing cheating. As a result, it was suggested that the class be divided into two groups and examined in sequence. Care was taken to prevent the first group from communicating the questions to the second group. However, after conducting the first session of the examination, it was obvious that the whole class could have been examined all at once, since the concerns about slide visibility and students' cheating were not substantiated.

The examiners were impressed by the efficient use of their time and the organization of the ViPSCE. They liked the fact that the spectrum and extent of the exam could be determined prior to the ViPSCE session giving it high

face and content validity. Moreover, the ViPSCE could easily be reproduced. They thought that the marking was well-structured and eliminated bias to a large extent.

Discussion

We have found the ViPSCE suitable to test the knowledge, problem solving and management ability of students. In these aspects it is superior to the traditional oral examination, since the ViPSCE is more reliable and eliminates a great deal of human bias and the 'luck of the draw' (Cohen *et al.*, 1990; Roberts & Norman, 1990; Famuyiwa *et al.*, 1991; Matsell *et al.*, 1991). The spectrum (contents) and depth could easily be determined, and the questions could be standardized. The pre-set model answers prevent inter-rater variation. In addition it economizes examiner's time and is easy to administer. Students found the ViPSCE fair, less stressful and more interesting than the oral examination. They also felt that it covered a broad spectrum of the curriculum, and the questions were relevant to hospital practice.

As was noticed in a previous study on traditional OSCE (Matsell *et al.*, 1991), students' scores on the ViPSCE correlated well with their results in the MCQs but correlated poorly with those of the clinical examination. Two explanations are proposed here that, nevertheless, require further study. One is related to the fact that both the ViPSCE and MCQs assess the same domain of knowledge and problem-solving abilities (Bloom's cognitive domain), whereas the clinical exam tests a different domain of clinical skills, such as history taking and physical examination. It could also be that the clinical examination in the form currently practiced is not well standardized. Different examiners, patients (exam material) and questions are involved, and there are no model answers.

The ViPSCE has many advantages over the conventional stations' OSCE when domains other than clinical skills are assessed. Moreover, ViPSCE allows the assessment of a large number of students in significantly shorter time. Students found the movement between stations in the conventional OSCE distracting, as well as time wasting. They preferred to sit comfortably and concentrate on answering the questions as they did in the ViPSCE. Many found the slide show technology more interesting and stimulating than OSCE.

It was important to note that the slide show could be prepared by a surgeon and a surgical registrar, who were not professional photographers or computer wizards. Apart from the initial cost of a digital camera, laptop PC, and video slide projector, we expect that in the long run it would be cost-effective. The ViPSCE economizes on the number of examiners and hours/days needed to assess large groups of students. This would certainly reduce the cost of the examination. Once a bank of questions and model answers is established, the preparation of such exams in the future would be greatly facilitated. On the day of the ViPSCE, both examiners' and students' time is greatly economized.

It is important, however, to note that the ViPSCE is not without limitations. It cannot be used to assess students' attitude towards patients, how they interact with patients, their professionalism or assess their skill in physical examination. These aspects need other tools of assessment, such as clinical examination and traditional OSCE.

Conclusion

The consensus of opinion of examiners and students favoured replacing the traditional oral (viva) examination by the ViPSCE for testing knowledge, problem solving and management abilities for final year medical students. One of its strongest points is the ability to assess large numbers of students in a much shorter time than traditional OSCE and viva. In addition, it requires fewer assessors. Since ViPSCE is less time-consuming, it would be more cost-effective than traditional OSCE and oral examination. Students and teachers judged it to be a great improvement over alternative ways of assessment including the OSCE.

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