

# The Introduction of Observed Structured Clinical Examinations (OSCEs) to the M.Pharm Degree Pathway

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The assessment of clinical competence is fundamental to ensure that graduate pharmacists are able to exercise their duties toward patients. The observed structured clinical exam (OSCE) has been widely adopted by the medical profession to assess student competence and has been introduced at the School of Pharmacy and Biomedical Sciences at Portsmouth University. An eight workstation OSCE was devised and delivered to fourth year M.Pharm students on three occasions. The first two classes were formative, whilst the final class was summative and contributed to 50% of the end of unit mark. Scores in all eight workstations improved between formative and summative sessions, some significantly. It was also shown that OSCE scores did correlate significantly with the students' overall end of year mark. Students believed that the OSCEs provided a useful learning experience and wanted them to be included earlier in the programme.

*Keywords:* Observed structured clinical exam; Competence; Assessment

## INTRODUCTION

A fundamental aspect of UK Government's commitment to modernise the NHS is the requirement of all healthcare providers to provide efficient, high quality care. Over the last 15 years, successive Governments have acknowledged that the education pharmacists receive at undergraduate level may not be being fully utilised. The realisation by Government that community pharmacy could and should change has heralded the beginning of an extension to the role of community pharmacists. Such an extension includes: prescribing advice to GP practices; reviewing patient medication; increased responsibility to act as a health promotion advisor; to help in risk management and to treat an increasing number of illnesses over-the-counter.

For pharmacists to deliver new roles and services, the undergraduate curriculum has had to evolve from a predominantly science-based taught syllabus to a mixture of science and social science. This has led to growing curriculum

content under the umbrella term of pharmacy practice. This discipline still covers traditional aspects of pharmacy, such as dispensing and law, but incorporates communication skills, health education, responding to symptoms and evidence-based practice.

Since 1997, all schools of pharmacy in UK have offered a 4-year M.Pharm degree programme. The extension of the degree programme from 3 to 4 years has given university teachers an excellent opportunity to restructure and change the curriculum content in light of the changing role pharmacists now perform. The traditional role of dispensing medicines is rapidly becoming a technical skill (Rutter *et al.*, 1999) performed by trained dispensers and technicians, allowing pharmacists to increase the time they spend on clinical roles (Perrett, 1999; Cousins, 2000). The evolution of the traditional role has necessitated teachers to review, and possibly alter, how they assess undergraduate students. Pharmacy educators have a responsibility to prepare students to become competent practitioners according to the standards set by the profession. Incorporation of modern assessment methods that address clinical competence is one such solution. Much can be learnt from the progress made by medical and nursing schools in changing from traditional models of teaching to the introduction of competency-based models.

Essentially, the medical and nursing professions have tackled the issue of clinical competence from two different perspectives. Medical schools have employed the observed structured clinical exam (OSCE) as an assessment of competence, whilst the nursing profession has adopted documentation of practice combined with self-reflection and peer review. The different approaches taken by the two professions are probably due to the way in which the curriculum are delivered. Medicine is primarily an academically delivered course with "work placements", while nursing tends to be more practice-based and is supplemented with academic input. Within a pharmacy context, the

OSCE is the more appropriate methodology to adopt as it is more closely associated with undergraduate medical teaching. The decision was taken, therefore, to introduce OSCEs into the fourth year of the undergraduate curriculum to assess student competence.

The OSCE was developed by Ronald Harden in Scotland and first reported in the *British Medical Journal* in 1975 (Harden *et al.*, 1975). Since that time the OSCE has become a well established and recognised format of assessment for medical undergraduates and qualified doctors who wish to gain further postgraduate qualifications (Grand-Maison *et al.*, 1992; Sloan *et al.*, 1996; Prislin *et al.*, 1998). The OSCE establishes whether or not a student is a competent practitioner in a professional context, unlike traditional assessment patterns that are likely to miss important elements of the skills that are to be assessed (Brown and Glasner, 1999). Within the medical field, the assessment of professional skills was initially addressed by formulating guidelines to help objectives for clinical evaluation; for example, scoring work as either satisfactory or unsatisfactory as the only acceptable grades (Rines, 1963). In addition, the technique of critical incident for the clinical evaluation for effective and ineffective behaviour was developed. However, both methods suffer from the subjectivity of the academic teacher (Fivars and Gosnell, 1966). A further limitation of these methods is that they tend to sample only a small range of skills. The skills measured are often the student's ability to interpret and synthesise data, while little attention is paid to the student's ability to acquire clinical data. The poor correlation between an individual's knowledge and psychomotor skills and between the subjective and objective assessment of those skills is well documented (Page and Fielding, 1980).

It is now generally accepted that any credible assessment process must have the attributes of reliability, validity, acceptability, feasibility (cost) and educational impact (McKinley *et al.*, 2001). If

any single element is missing the overall utility of the assessment will be zero (Van der Vleuten, 1996).

A substantial body of research work on OSCEs has looked into these attributes. Consensus opinion is that OSCEs are a valid, reliable and accepted method of assessment to medical undergraduates (Cusimano *et al.*, 1994; Carpenter, 1995; Hodges *et al.*, 1998). It appears that OSCEs are costly, although reportedly costs can be managed by judicious employment of standardised patients (Carpenter, 1995). The educational impact from OSCEs appears to have been less well researched, although authors have reported high levels of student satisfaction (Lazarus and Kent, 1983; Jeffery *et al.*, 1996).

#### What is Involved in An OSCE?

The OSCE can be used both formatively and summatively and can be adapted to any situation where adequate performance is required. The OSCE is a composite of many single observational assessments of clinical performance and competence, and is similar in format to the more familiar laboratory examination. Examinees rotate around a series of stations (each station assesses a different performance or skill), spending a specified amount of time at each station. Time is allowed for examinees to move between stations.

The number of stations and time spent performing each one will vary depending on what is being assessed. There are two types of station:

**Observer:** A typical observer station consists of a task, presented in a two or three sentence scenario, and a request for the appropriate action. Performance is rated by the observer using a predetermined checklist. Real or simulated patients who can consistently repeat their story for the required number of examinees may be solicited for these stations.

**Marker:** A typical marker station consists of the presentation of data with a request for its

interpretation, synthesis or appropriate action in the form of a short answer or multiple choice questions. Responses are rated following completion of the station by markers using predetermined responses, which have been judged correct by a panel of experts.

Inter-rater reliability for a given task at a workstation is usually adequate because only one assessor assesses the task for all the test-takers. Competency is not just isolated to professions allied to medicine but can be equally applied to students studying to become lawyers, surveyors and teachers. Hounsell illustrates innovative assessment patterns applicable to many courses in which competency needs to be assessed (Hounsell *et al.*, 1996).

#### METHOD

In 1999, a pilot study was conducted with final year (at the time, third year B.Sc pharmacy) undergraduates to assess the acceptability, feasibility and educational impact of introducing OSCE style assessments. The pilot consisted of two practical sessions where students had to check a number of prescriptions that had been previously dispensed and labelled but which incorporated a number of deliberate errors. Student opinion was canvassed after the final practical session to ascertain whether they thought it was a useful and educationally valuable exercise. Their comments, in conjunction with peer feedback, helped to shape the format of the OSCEs introduced in 2001.

Eight workstations were devised to represent the broad range of information from which students would have to draw when practising in the community (Appendix A). For each workstation, scenarios were devised and discussed within the division for appropriateness. Marking criteria were devised and agreed upon.

Seven of the stations lasted 5 min and one station (checking prescriptions) lasted 15 min. The practical classes took place in March and

April 2001 and consisted of two formative practical classes followed by a summative assessment, accounting for 50% of the end of unit grade. Four months prior to the OSCEs, students were given a lecture on the format, allowing them time to prepare for the classes and seek further information. After each formative practical students received their scores for each workstation and had an opportunity for individualised feedback.

In the two formative practical classes, each 5 min workstation carried 10 marks and the checking station 30 marks. The checking station also carried negative marking. A score of -10 was given if students failed to spot any of three major errors: an overdose, a wrong product dispensed or a clinically significant interaction. Therefore, the student could score between -30 and +30 for that station. For the assessment the marking criteria was slightly modified. The seven 5-min stations still carried 10 marks but the checking station had less punitive negative marking, with each major error missed carrying -5 marks rather than -10 marks; scores for the checking station could range between -15 and +30.

Marks were entered into a spreadsheet and tracked over the three practicals. Scores from the two formative practicals were combined and a mean score derived, which was then compared to the summative assessment score for each workstation. Statistical analysis of the two data sets was performed using Minitab. In addition, a

survey was distributed to all fourth year students after the summative assessment to canvass their opinion on the OSCEs. Data were analysed using Snap5Plus! (Bristol).

## RESULTS

Seventy-four final year students took part in the OSCE practicals. However, comparable data were only available for 71 students as three students failed to attend all three classes. The response from the student survey was 82%  $n = 61$  although three of the surveys were spoiled and unusable. Scores attained by the students in the two formative assessments and the summative end of unit assessment are shown in Table I.

The score in each workstation improved between the formative and summative assessments. Five of the workstations saw a significant improvement in performance ( $p < 0.001$ , paired  $t$ -test). Only scores for counselling and responding to symptoms "2" did not significantly improve. Scores obtained in the checking workstation cannot be directly compared as marking criteria changed between formative practicals and the summative assessment. However, when the data are converted into percentages, an increase in scores of over 40% is seen between the formative practicals and summative assessment.

Sixty-nine of the seventy-one students scored higher in the summative assessment compared to the formative practicals, with scores rising by

TABLE I Scores attained by students for each OSCE workstation

	Formative practicals (mean score $\pm$ 95% confidence interval)	Summative assessment (score $\pm$ 95% confidence interval)
Checking	-11/30 $\pm$ 9.3	3.0/30 $\pm$ 11.5
Counselling	5/10 $\pm$ 0.56	5.4/10 $\pm$ 0.47
Responding to symptoms 1	4.9/10 $\pm$ 0.45	6.4/10 $\pm$ 0.49*
Responding to symptoms 2	6.6/10 $\pm$ 0.49	6.7/10 $\pm$ 0.53
General pharmacy issues	6.5/10 $\pm$ 0.38	7.5/10 $\pm$ 0.32*
Law and ethics	5.7/10 $\pm$ 0.43	7.0/10 $\pm$ 0.53*
Commonly used drugs	6.1/10 $\pm$ 0.54	7.1/10 $\pm$ 0.46*
Calculations	2.8/10 $\pm$ 0.41	6.1/10 $\pm$ 0.59*

\*Scores are significantly different at  $p < 0.001$ , paired  $t$ -test.

TABLE II Number of students attaining a higher score in the summative assessment compared to the formative practicals for each workstation

Workstation	Student number $n = 71$
Checking	58/71
Counselling	38/71
Responding to symptoms 1	54/71
Responding to symptoms 2	37/71
General pharmacy issues	50/71
Law	55/71
Commonly used drugs	59/71
Calculations	64/71

an average of 51%. The number of students obtaining a higher score in an individual workstation in the summative assessment varied (Table II). Students appeared to perform much better in all but the counselling and responding to symptoms 2 workstations and this is consistent with the statistical findings.

Although 58 students improved their mark in the checking workstation, the overall score was still low (+3/30). These results were largely due to the negative marking scheme adopted.

To determine if OSCE assessment scores genuinely reflected the students' ability, the

OSCE scores were compared to each student's final fourth year mark. A significant correlation between the OSCE scores and the overall fourth year marks was found ( $p < 0.001$ , Spearman's correlation coefficient).

Students were given the opportunity to express their opinion on the OSCEs after they had completed the summative assessment. Fifty-eight responses were received. Students thought that they would perform best in the counselling patients and law and ethic workstations and felt they would perform least well in checking. Scores did show that students performed least well in checking. For counselling, however, their performance did not match their perceptions. Students were also asked to indicate their level of agreement with statements relating to the administering of OSCE practicals on a scale of one to five. The results are shown in Table III.

Students had mixed opinions about the information they received prior to the OSCEs. More students believed that they had enough time to prepare for the OSCEs and the information provided by staff was sufficient to know what the OSCEs involved ( $p = 0.02$ ,  $\chi^2$ ).

TABLE III Students' response to the OSCE experience ( $n = 58$ )

Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The information received prior to the classes was sufficient to know what the classes involved	6 (10.3%)	19 (32.8%)	13 (22.4%)	13 (22.4%)	7 (12.1%)
Time given to prepare for the classes was sufficient*	9 (15.5%)	19 (32.8%)	8 (13.8%)	17 (29.3%)	5 (8.6%)
OSCEs should be part of undergraduate teaching	20 (34.5%)	25 (43.1%)	9 (15.5%)	2 (3.4%)	2 (3.4%)
OSCEs allowed me to identify areas of personal weakness	21 (36.2%)	33 (56.9%)	3 (5.2%)	0 (0%)	1 (1.7%)
The two practical sessions prior to the assessment allowed me to understand what was expected**	6 (10.3%)	29 (50%)	9 (15.5%)	9 (15.5%)	5 (8.6%)
On the whole the questions asked were pitched at the right level**	8 (13.8%)	26 (44.8%)	13 (22.4%)	9 (15.5%)	2 (3.4%)
OSCEs have provided a useful learning experience	14 (24.1%)	34 (58.6%)	6 (10.3%)	4 (6.9%)	0 (0%)
OSCEs should be started earlier in the course	47 (81.0%)	8 (13.8%)	2 (3.4%)	1 (1.7%)	0 (0%)

\* $p < 0.02$  and \*\* $p < 0.001$ ,  $\chi^2$  test (frequencies of strongly agree and agree to disagree and strongly disagree).

More interestingly, students believed that the OSCEs provided a useful learning experience (83% agreed or strongly agreed), allowing their strengths and weaknesses to be determined. Students overwhelmingly believed that the OSCEs should be included in undergraduate teaching (78%). However, the vast majority wanted the OSCEs to start earlier in the programme (95%). This finding was substantiated by additional student comments made at the end of the survey. Students wanted the OSCEs to be introduced into either the third year or the first semester of the fourth year. They also believed that the formative practicals were useful and that the questions were pitched at the right level ( $p < 0.001$ ,  $\chi^2$ ). Over 80% of students agreed that the OSCEs had provided a useful learning experience, although a number of students ( $n = 24$ ) expressed concerns. Firstly, the imposition of a 2 min time limit on each prescription during the checking workstation was felt to be too short and unfair, especially when a prescription had four items on it. Secondly, the number of practical sessions they had before the summative assessment was felt to be inadequate; they believed that more practical sessions were needed prior to the assessment. Only one student specifically stated that they did not feel OSCEs were appropriate and were unfair. Interestingly, this student was one who failed to gain a 40% pass mark.

## DISCUSSION

OSCEs are a credible assessment pattern within the medical profession for establishing clinical competence. Until recently OSCEs did not feature in the undergraduate curriculum of UK schools of pharmacy, although a number of schools now perform them (Belcher *et al.*, 2000). Following pilot work in 1999, the pharmacy practice division at Portsmouth University introduced an eight workstation OSCE into the fourth year of the M.Pharm degree pathway.

OSCEs were evaluated to determine whether they represented a valid and appropriate assessment pattern that allowed students to demonstrate clinical competence over a range of key skills.

It was encouraging to see improvement in overall student performance in all workstations between the formative practicals and the summative assessment. The increase in workstation scores was probably a result of the tutorial support offered between classes, although repeated student exposure to a new assessment pattern may also have contributed to the positive findings. The majority of students in all workstations, except in counselling and responding to symptoms 2, improved their individual mark between the formative practical and the summative assessment. The lower number of students improving their mark in responding to symptoms 2 may be because their formative practical performances were already very good (6.7/10), so improvement would be more difficult when compared to workstations such as calculations (2.8/10). One cause for concern was the scores achieved from the counselling workstation. Scores show that student performance was the poorest of all the 5 min workstations. No logical explanation can be put forward for the results obtained. Students undergo communication skills training and have opportunities within pharmacy practice units to practice counselling simulated patients. One possibility for the poor performance is that students perceive this skill as easy and believe their communication skills are satisfactory, since talking to people and patients is an everyday task. This possible complacency and lack of self-reflection on their performance may account for their scores.

The checking workstation was a major cause for concern with the students. It created great anxiety amongst the cohorts and was the main reason why students sought tutorial support. The negative marking component of the station caused the greatest worry, especially after the first cohort had received primarily negative

scores. Seventy percent of errors were technical in nature; for example, transposition of labels, incorrect quantity supplied, patient name misspelled on the label and illegal controlled drug prescriptions. Students cited their poor performance was mainly due to the time constraint placed upon them, which gave rise to panic and rushed the checking of items. The imposition of a 2 min limit was intentional to try and simulate a practice environment in which students would experience the type of pressure they will encounter when working both as a preregistration pharmacist and when qualified. However, the tutorial system revealed the singular biggest problem with students was the lack of a checking routine. All students received a handout on how to devise a checking routine in the interim period between the formative practicals and the summative assessment to improve their performance.

The summative scores awarded to students from the OSCEs were compared to the overall fourth year mark from all units (these included units other than pharmacy practice). A significant correlation was found between the two marks and suggests that OSCEs can predict how well a student will perform overall in relation to his or her peers. This correlation may prove potentially very useful in allowing academic members of staff to identify students who may need additional support and guidance, especially if OSCEs were introduced into years other than the fourth year.

On an academic level, the OSCEs appear to have been successfully introduced and do provide evidence of clinical competence, but it was important to allow students to voice their opinion of the experience. Prior to and during the OSCE classes, students did complain to members of staff about the amount of preparatory work and the difficulty involved in the OSCEs. However, feedback from the surveys was largely supportive of the concept and the educational value recognised. Self-reflection by students may have resulted in this apparent change of opinion,

for they recognised that although the OSCEs were challenging they did provide a useful learning experience that exposed their strengths and weaknesses. Such identification subsequently allowed them to concentrate on areas of weakness and consolidate their strengths. This practical format allowed individuals to realise that they had skill deficits in certain areas and encouraged them to remedy the situation. This identification of skill deficits would be hard to replicate under normal assessment patterns (for example, coursework and examination).

In recognition of student opinion toward the OSCE format, the Division has already begun to redesign elements of the programme courses. Concern over lack of practice when checking prescriptions has led to checking being introduced into all practical dispensing units starting in year two of the programme. A structured approach to checking will be implemented whereby level two students undertake simple checking exercises, but levels three and four will have complex checking to complete that will be time limited. This exhaustive induction to checking should provide the extra practice students stated they needed. Of academic concern was the poor level of counselling provided by students. In response to this, alteration to the communication skills unit in year two is planned for implementation in September 2001 which will hopefully address this issue.

## CONCLUSION

The introduction of OSCEs at Portsmouth University Pharmacy Practice Division has been successful. OSCEs appear to give academic teachers and students alike an insight into a person's clinical competence over a wide range of key skills and provides an opportunity to measure how well students can apply knowledge rather than remember facts.

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## APPENDIX A

TABLE AI

Workstation	Abbreviated description of the workstation
Responding to symptoms 1	Students had to question a patient (a lecturer) who presented them with an internal minor ailment
Responding to symptoms 2	Students had to question a patient (a lecturer) who presented them with an external minor ailment. A visual cue (photograph) was also presented to the student
Checking prescriptions	Prescriptions with differing numbers of items (range between one and four items) were dispensed and labelled incorporating a number of deliberate errors. A 2 min time limit was imposed on each prescription
Counselling patients	Students were asked to counsel a patient (lecturer) on either a specific medicine (e.g. an SSRI) or a particular route of delivery (e.g. pessary)
Calculations	Three calculations had to be completed in 5 min at an unmanned workstation
Pharmacy law and ethics	Each student was questioned by a lecturer on a specific topic (e.g. emergency supplies)
Commonly used drugs	Students were given a list of 35 commonly prescribed medicines to learn 3 months prior to the OSCEs. The station consisted of a lecturer asking questions relating to these medicines
General pharmacy practice issues	This station covered over-the-counter medicines and questioned the students' knowledge of this area