A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College, India

Reem Rachel Abraham,1 Rao Raghavendra,2 Kamath Surekha,1 and Kamath Asha3

1Department of Physiology, Melaka Manipal Medical College (Manipal Campus), Manipal; and Departments of 2Physiology and 3Biostatistics, Kasturba Medical College, Manipal, Karnataka, India

Submitted 8 February 2008; accepted in final form 17 November 2008

Abraham RR, Raghavendra R, Surekha K, Asha K. A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College, India. Adv Physiol Educ 33: 21–23, 2009; doi:10.1152/advan.90108.2008.—A single examination does not fulfill all the functions of assessment. The present study was undertaken to determine the reliability and student satisfaction regarding the objective structured practical examination (OSPE) as a method of assessment of laboratory exercises in physiology before implementing it in the forthcoming university examination. The present study was undertaken in the Department of Physiology of Melaka Manipal Medical College, Manipal Campus, India. During the OSPE, students were made to rotate through 11 stations, of which 8 stations were composed of questions that tested their knowledge and critical thinking and 2 stations were composed of skills that students had to perform before the examiner. One station was kept as the rest station. Performance of the students was assessed by comparing the students’ scores in the traditional practical examination (TPE) and OSPE using “Bland-Altman technique.” Student perspectives regarding the OSPE were obtained by asking them to respond to a questionnaire. The Bland-Altman plot showed that ~63% of the students showed a performance in the scores obtained using the OSPE and TPE within the acceptable limit of 8; 32% of the students scored much above the anticipated difference in the scores, and the rest scored below the anticipated difference in the scores on the OSPE and TPE. Feedback indicated that students were in favor of the OSPE compared with the TPE. Feedback from the students provided scope for improvement before the OSPE was administered for the first time in the forthcoming university examination.

Methods

At MMC, there are two admission intakes per year: one in March and another in September. The first-year curriculum is divided into four blocks. At the end of each block, students undertake two examinations, both in theory and laboratory exercises. The present study was undertaken for the March 2007 group of students (n = 125 students) at the end of the third block (in November 2007). These students had undertaken the traditional practical examination (TPE) at the end of the first and second blocks. The TPE in physiology consisted of two components: computer-assisted OSPE (COSPE) (12) and performance exercises. In COSPE, 10 PowerPoint slides focusing on the interpretation of graphs, diagnosis of clinical conditions from photographs, identification of blood cells, reading the packed cell volume (PCV)/erythrocyte sedimentation rate, problems on the calculation of clearance/forced expiratory volume in the first second, etc., were projected onto a LCD screen with an autodisplay that projected a new slide every 3 min (each slide represented an original OSPE station). Each of these stations had questions carrying four marks. After finishing the COSPE, which took ~30 min, students had to undertake the performance examination. In the performance examination, students were given two tasks (for example, determination of vital capacity, blood pressure recording, etc.). Students were required to perform these tasks in the presence of the examiner followed by a viva voce on the experiments that they had performed. The OSPE was introduced at the end of the third block. During OSPE examination, the same students (March 2007) were divided into three groups, and each group was required to report at a different time. In each group, four subgroups (with each subgroup consisting of 10 students) were made. Students were made to rotate through 11 stations. Eight stations were composed of questions that tested students’ knowledge and critical thinking, and two stations were composed of skills that students had to perform before the examiner. One station was kept as the rest station. The two stations in which students had to perform a task were composed of questions such as focusing the red blood cell-counting area in a Neubauer’s chamber, palpation of apex beat, determination of the systolic blood pressure, etc. Students were given 3 min at each station. The entire examination was conducted in 1 day in three sessions with each session consisting of four circuits. Questions were on topics from all three blocks. Student performance in the TPE and OSPE was compared using “Bland-Altman technique” (Fig. 1). Student perspectives regarding the OSPE were obtained by asking them (March 2007 students) to respond to a questionnaire (Table 1).
felt that the clinical pictures shown were not clear. too short, especially for the performance exercises. They also less, 56.6% of the students felt that the time given (3 min) was
examinations (COSPE and performance exercises). Neverthe-
with the TPE, where they had to go through two separate
had to go through only one round of examination compared
forthcoming block as well as university examinations, as they
felt that the OSPE should be the pattern of examination in the
knowledge compared with the TPE (86%). Students (76.22%)
felt that the questions asked were relevant and
examiners and also the subjectivity of the examination. They
complain about the irrelevant questions asked by the
exercises varied in difficulty, giving rise to much variation in
scores on the OSPE and TPE (Table 1). Table 2 shows
students’ perspectives regarding the OSPE. Ninety-five percent
improvement in the mean scores for the laboratory component
of final examinations in the physiology courses at King Faisal
University Medical School. The block-end practical examination
at MMMC used to be conducted in four sessions (1 session
for COSPE and 3 performance sessions), which required 1
whole day. The university examination used to be conducted in
both before-noon and afternoon sessions for 3 consecutive
days. In the university examination, external examiners used to
complain about the extensiveness of the examination. Students
used to complain about the irrelevant questions asked by the
examiners and also the subjectivity of the examination. They
used to complain that the questions asked in the performance
exercises varied in difficulty, giving rise to much variation in
the scores. OSPE was adopted as a method of assessment with
the intention of restricting the examination only in the before-
noon sessions, thereby reducing the total time, to make the
assessment uniform for all students and also to reduce the
stress of students by making them go through only one round
of examination instead of two rounds.

From the students’ point of view, the OSPE was acceptable and
generated wide appreciation. In a study conducted by Malik et al. (5),
OSPE was rated by the students as a reliable, effective, useful,
interesting, and challenging examination, although it was considered
taxing, both mentally and physically. Feedback from the students
(March 2007) indicated that students were in favor of the OSPE
compared with the TPE (Table 1). The feedback provided scope for
improvement before OSPE was administered for the first time in the
forthcoming university examination. This study reveals the impor-
tance of the role of students in developing new assessment tools.

In conclusion, the present study revealed that the OSPE was
well accepted by the students compared with the TPE. The study
provided scope for refining the method before it was implemented
for the first time in the forthcoming university examination.

### RESULTS

The Bland-Altman plot (Fig. 1) showed that ~63% of the
students showed a performance in the scores obtained using
the OSPE and TPE within the acceptable limit of 8; 32% of the
students scored much above the anticipated difference in the
score, and the rest scored below the anticipated difference in the
scores on the OSPE and TPE (Table 1). Table 2 shows
students’ perspectives regarding the OSPE. Ninety-five percent
of the students felt that the questions asked were relevant and
that the OSPE was comprehensive and covered a wider area of
knowledge compared with the TPE (86%). Students (76.22%)
felt that the OSPE should be the pattern of examination in the
forthcoming block as well as university examinations, as they
had to go through only one round of examination compared
with the TPE, where they had to go through two separate
examinations (COSPE and performance exercises). Neverthe-
less, 56.6% of the students felt that the time given (3 min) was
too short, especially for the performance exercises. They also
felt that the clinical pictures shown were not clear.

### DISCUSSION

Several studies have proved the objective structured clinical
examination as a reliable assessment tool (2, 10). In the present
study, the format of testing by the OSPE was similar to that of
the objective structured clinical examination. Previous studies
have reported that OSPE is an effective tool in discriminating
between good and poor performers in physiology practical
examinations (6, 8). Dissanayake et al. (1) reported a marked
improvement in the mean scores for the laboratory component
of final examinations in the physiology courses at King Faisal
University Medical School. The block-end practical examination
at MMMC used to be conducted in four sessions (1 session
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### Table 1. Comparison of the performance of students in the OSPE and TPE

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the anticipated difference</td>
<td>77</td>
</tr>
<tr>
<td>Below the anticipated difference</td>
<td>7</td>
</tr>
<tr>
<td>Above the anticipated difference</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
</tr>
</tbody>
</table>

The anticipated limit was 8. OSPE, objective structured practical examination; TPE, traditional practical examination.
ACKNOWLEDGMENTS

We thank all the March 2007 students for participating in this study and giving valuable feedback.

REFERENCES