

**Evaluación continua
mediante exámenes clínicos
estructurados por objetivos
en Propedéutica Clínica
Veterinaria**

**Continuous Assessment
through Objective Structured
Clinical Examinations
in Veterinary Clinical
Propaedeutics**

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Resumen

El objetivo de este estudio fue evaluar la actitud de los estudiantes de veterinaria hacia el uso de exámenes clínicos estructurados por objetivos (OSCE) como un método para la evaluación continua de la adquisición de las habilidades clínicas relacionadas con el examen físico de los animales. Los estudiantes realizaron quincenalmente dos OSCE a lo largo de un semestre, después de lo cual contestaron voluntariamente a una encuesta

Abstract

This study aimed to evaluate the attitude of veterinary students to the use of Objective Structured Clinical Examination (OSCE) as a method for continuous assessment of the acquisition of clinical skills related to the physical examination of animals. Students undertook fortnightly two OSCEs throughout a semester, after which an anonymous electronic survey was distributed before the final written exam. The results of the questionnaire indicated

electrónica de forma anónima antes del examen final escrito. Los resultados del cuestionario indican que los estudiantes mostraron una buena actitud hacia la evaluación frecuente mediante OSCE; por otra parte, esta metodología también les ayudó no sólo a estudiar y practicar con más regularidad, pero como se les facilitó de antemano el listado de habilidades del que iban a ser evaluados, también les ayudó a centrarse más durante el tiempo de docencia presencial. Además, alentaron el mantenimiento del método de evaluación para los cursos sucesivos, y también proporcionaron algunas sugerencias para mejorar. Por tanto, se concluyó que los alumnos muestran una actitud positiva hacia la evaluación continua mediante la OSCE, la cual tiene un impacto no sólo en el comportamiento de aprendizaje, sino también en el uso de las horas de docencia. Por otra parte, los alumnos están encantados de proporcionar su valoración sobre la metodología de evaluación, proporcionando a veces apreciaciones que podrían haber pasado desapercibido a los docentes; y por ello su opinión en este ámbito debe ser también solicitada.

Palabras clave: Evaluación, habilidades clínicas, opinión estudiantil, competencias, docencia clínica.

that students display a good attitude to being assessed frequently by OSCEs; furthermore, it also helped them not only to study and practice more regularly, but as they were told in advance what they would be assessed on, it also helped them to be more focused during teaching time. Furthermore, they encouraged the maintenance of the assessment method for the following year and also provided some suggestions for improvement. It is therefore concluded that students display a positive attitude to continuous assessment by OSCE, which has an impact not only on the students' learning behavior, but also on the use of teaching hours. Furthermore, students are also delighted to give on the assessment methodology, providing sometimes an insight that could have gone unnoticed by the faculty, and hence their opinion should be requested.

Key words: Evaluation, clinical skills, students' opinion, competence, clinical education.

Introduction

Assessment has a major impact on students' learning behavior (Frederiksen, 1984; Newble & Jaeger, 1983) and educators can use this tool to ensure that students learn what and how academics want them to learn (Schuwirth & van der Vleuten, 2010). Traditional examinations in veterinary education typically only stimulate factual recall. However, for assessing clinical skills it is necessary to evaluate the candidate performing them, and in this context the Objective Structured Clinical Examination (OSCE) provides a framework to assess the hands-on skills of the examinee in a controlled and simulated environment (Davis *et al.*, 2006; Harden *et al.*, 1975; Hodges, 2006), and is a good example of assessment as a learning strategy (Fuentealba, 2011). The OSCE was developed in the mid-1970s (Harden & Gleeson, 1979) as an answer to the limited validity and reliability of

traditional clinical assessments (Newble, 2004). The OSCE is unique among assessment formats because it provides a framework to assess the hands-on skills of the candidate in a simulated setting, thereby evaluating the examinee at the level of *competence*, in contrast to assessing skills in real-life situations, which would mean evaluating at the level of *performance* (van der Vleuten, 2000). Therefore it is appropriate only at Miller's pyramid (Miller, 1990) level 'shows', but not 'does' since the assessment is completed in an artificial setting.

OSCE's utility is indubitable in human medicine and has already been used as an assessment method in other health science disciplines such as dentistry (Manogue & Brown, 1998), pharmacy (Sibbald & Regehr, 2003), nursing (Major, 2005), and physiotherapy (Nayer, 1993), among others. In 2006, OSCEs were described as emergent in veterinary medicine education (Hodges, 2006), although projects were already ongoing at different veterinary schools within the United Kingdom, Canada, and Jerusalem at that point, and reports of their use in veterinary education have already been published (Bateman *et al.*, 2008; Hecker *et al.*, 2010). The results of a more recent survey within the United Kingdom Higher Education institutions revealed that OSCEs are used extensively as an assessment method – for both summative and formative assessment – in medicine, dentistry, nursing, and veterinary and veterinary nursing education, although usually combined with other assessment methods (Hammond, 2009). However, to the best of the authors' knowledge, OSCE has not been implemented so far as an assessment method in any of the Spanish veterinary science colleges, despite the assessment processes and procedures audit by the European Association of Establishments of Veterinary Education (EAEVE) during their rolling cycle of visitations.

In Europe, The Bologna Declaration ("Joint declaration of the European Ministers of Education convened in Bologna on 19 June 1999," 1999) and the establishment of the European Higher Education Area ("The Bologna process: setting up the European Higher Education Area" 2010) meant a complete restructuring of higher education teaching. In Spain in particular, it meant a thorough changing of the degree curricula. Furthermore, it implicated a move towards a continuous assessment of students' performance, offering a methodology for both testing students' achievement and using the results to improve the success of the students during the academic year, giving the students the opportunity to monitor their achievements and to be aware of their progress in each course, so that they can make more effort in those areas of weakness and can be in charge of their own learning process.

We received the first cohort of students from the Bologna adapted curriculum in the academic year 2012-13 (3rd year of the curriculum), and as we were requested to continuously assess the students' progression throughout the semester, and as our subject is mainly linked to the acquisition of skills related to the clinical examination of the living animal, we decided to perform OSCEs regularly (more detailed information is given in the Methodology section), bearing in mind their benefits for testing clinical competence (Davis *et al.*, 2006). However, there is evidence of the use of OSCE as a pre- or post-test, as well as an in-course test (Davis *et al.*, 2006), although in this case only either for standpoint, formative, or course evaluation, and not as a continuous summative assessment method. Therefore, the objective of the present report was to investigate students' satisfaction and opinions after a semester of sitting two OSCE exams fortnightly, for which an electronic survey was employed.

Methodology

Permission for the procedures of the study was granted by the Bioethical Committee of the University of Santiago de Compostela.

Subject organization and assessment methodology

Within the curriculum of the degree in Veterinary Medicine set by the University of Santiago de Compostela (2011), the half-year subject of *Veterinary Clinical Propaedeutics* involves the methods and procedures of clinical examination, additional diagnostic techniques, and their interpretation, as well as the recognition and diagnosis of different types of lesions and their association with disease processes in the living animal. It consists of 22 hours of lecture-based teaching and 35 hours of hands-on teaching divided into 14 sessions of 2.5 hours each, with 6 of these sessions being related to the clinical examination of small animals, another 6 to that of large animals and from the remaining two, one to clinical pathology and the other one of electrocardiography. The sessions are organized so that each student must attend fortnightly throughout the semester two sessions, one of large and another of small animals.

Students were provided before each session with a teaching guide containing all the materials needed to start the clinical examination of the different organs and systems. At the end of this guide, a list of the practical skills that the students are supposed to acquire is given. During the following practical session with the same species, the first half an hour is devoted to assessing the skills of the previous session, where the skills given in the guide are selected as one of the 3–4 OSCE stations (examples of OSCE stations are shown in Table n.1). Grading of each station was performed using rating scales with three possible outcomes: fail, pass, or merit. The summative grade of all the OSCE stations is what constitutes the continuous assessment mark. Brief feedback is also given to students after the completion of each station and, when requested, it is provided with more detail during faculty office hours.

Table 1. Examples of OSCE stations used for assessment.

1	Check the pulse of the dog.
2	Check if the cow has a left displacement of the abomasum.
3	Perform an examination of the ocular reflexes of the dog.
4	Examine the paranasal sinuses of the cow.
5	Open the mouth of the dog and perform a visual inspection of the oral cavity.
6	Obtain a milk sample from a cow in order to perform the California Mastitis Test and interpret the results obtained.

Source: Original

The assessment of the subject entails the continuous assessment through OSCEs previously explained and a final written exam consisting of multiple-choice questions and interpretation of images, videos, and sounds, where the knowledge acquired both in theoretical and practical sessions is assessed; each part represents 50% of the final mark. According to the Spanish regulations, the student passes the subject when an overall mark of 5.0 on a 0–10 scale is achieved.

Sample

Since the start of the new curriculum, two cohorts of veterinary students (74 for the academic year 2012–13 and 101 for the year 2013–14) have been assessed as previously explained and they represent the population for this study.

Instruments

An anonymous online survey based on SurveyMonkey™ was distributed among the students enrolled in the subject through the virtual learning environment and made available to them once they had finished all the OSCE examinations, but before the written exam was taken. The questionnaire consisted of 8 statements related to their perception about the assessment methodology, its organization, and its arrangement in respect of other learning duties in the same semester. Students were requested to express their agreement with these statements on a 1–5 Likert scale (1 = strongly disagree; 5 = strongly agree). Furthermore, free text questions allowed the students to express their opinions about the assessment methods and propose improvements for upcoming years. Descriptive statistics of the results were calculated with the SPSS v.19 for Windows software package.

Results

One hundred forty-five out of 174 students enrolled completed the survey (83.3% response rate, 77% [57/74] and 88% [88/100]) for the academic years 2012/13 and 2013/14, respectively). Their answers are summarized in Table n.2. When asked whether the assessment method helped them to study the subject regularly (S1), the mean value of 4.44 obtained indicated that the continuous assessment method did help them to keep up to date with the subject contents. Furthermore, a mean value of 2.08 in the answers when asked whether they would have studied so regularly in the event of absence of continuous assessment (S2) showed that the assessment method employed did have an effect on the students' learning behavior, as already reported for medical students by Newble and Jaeger (1983).

With regard to the impact of the assessment method on the development of the semester, a mean value of 4.53 in the responses to the question of whether studying for regularly exams was more bearable than for a final assessment (S3), with no respondent strongly disagreeing, and the mean value of 4.67 to the statement concerning the possible positive impact of providing a list of the skills to acquire in each session on the use of the time thereof (S4), with no respondent strongly disagreeing and only two disagreeing, implied that the assessment method employed had an impact not only on the self-study time of the students, but also on the efficiency of the teaching time.

Table 2. Student questionnaire responses. SD = standard deviation.

Statements	Quartiles ²				Responses (n=145), % (number of answers)				
	Mean (SD)	25th	50th	75th	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
S1. Taking an exam after each practical session helped me to keep up to date with the subject	4.44 (0.79)	4	5	5	0.7% (1)	3.7% (5)	4.1% (6)	34.5% (50)	57.2% (83)
S2. I would not have studied so regularly if there was no continuous assessment	2.08 (0.88)	1	1	2	49.0% (71)	35.2% (51)	11.7 (17)	2.8% (4)	1.4% (2)
S3. The subject was more bearable as a result of having to prepare the skills for each session rather than altogether for a final exam	4.53 (0.76)	4	5	5	-	2.1% (3)	10.3% (15)	20.0% (29)	67.6% (98)
S4. The provision of a list of skills to acquire in each practical session helped me to focus on the key points during sessions	4.67 (0.65)	4.5	5	5	-	1.4% (2)	5.5% (8)	17.9 (26)	75.2 (109)
S5. It was difficult to reconcile the continuous study with the other programmed activities of the other subjects in the same semester	3.54 (1.11)	3	4	4	5.5% (8)	13.1% (19)	22.8% (33)	39.3 (57)	19.3 (28)
S6. I would rather take a practical exam at the end of the semester instead of the continuous assessment	1.52 (0.91)	1	1	2	66.2% (96)	22.8% (33)	6.2% (9)	2.1% (3)	2.8% (4)
S7. The weight of the continuous assessment (50%) in the final mark of the subject is excessive	1.79 (1.09)	1	1	2	51.7% (75)	31.0% (45)	9.7% (14)	1.4% (2)	6.2% (9)
S8. The continuous assessment should have more weight in the final mark	2.74 (1.25)	2	3	3	20.0% (29)	22.1% (32)	33.8% (49)	11.7% (17)	12.4% (18)

Source: Original

Students usually prefer to study for continuous assessment than for the usual final examinations (Cruickshank *et al.*, 1975) on the basis of easiness to study for small topics (Seibu *et al.*, 2006). In this case, although it was hard for the respondents to combine their studying with other tasks from other subjects (S5, mean value of 3.54), they did not prefer to sit only a final exam (S6, mean of 1.52). Taking into consideration the benefits of continuous assessment in identifying those students most likely to fail (Muzyamba *et al.*, 2012), who need to be monitored and advised more closely, and the positive attitude to this evaluation methodology found in the students, OSCEs can also be used as a continuous assessment method in veterinary clinical propaedeutics.

Students were also requested to express their opinion on the weight given to the continuous assessment in the final mark of the subject, agreeing that 50% of the final mark was not excessive (S7) for the continuous assessment with a mean value of 1.79, but they did not agree on whether OSCEs should be given more weight in the final mark (S8), as the mean value was 2.74, falling in between neutral and disagreeing. Therefore we believe that half of the final mark is a good proportion for the continuous assessment of clinical skill acquisition in our subject, bearing in mind the relevance of the skills being taught, not only for the purposes of the subject, but also for the future professional life of the examinees.

The majority of the comments received from students in the free text questions were dedicated either to expressing their satisfaction with the assessment method,

- “Being continuously assessed in clinical skills allowed me to realize how I was improving throughout the semester”¹
- “Knowing beforehand what I could be assessed on helped me to be more centered when practicing and studying”

to encouraging the maintenance of the assessment method for following years, or to expressing their satisfaction with the fact that their opinion on the assessment method was requested:

- “Although sometimes it was arduous to combine studying for the frequent exams with other tasks from other subjects, at the end of the semester you realize that it is worthwhile and somehow you find that you have already passed half the of the subject. I really encourage the maintenance of this assessment method for following years”
- “I was astonished by the fact that we have the opportunity to express ourselves about the assessment method, as it is considered as something that only concerns teachers; it was really nice that the faculty asked students about their opinion.”

¹ As the survey was performed in the Spanish language, the quoted opinions were translated into English in an attempt to express what students wrote in the most reliable way.

² The second quartile (50th percentile) is the median. If all the responses were ordered numerically, the first quartile (25th percentile) would be the response in the middle of the sequence of numbers running from the start (lowest value) to the median. The third quartile (75th percentile) is the value between the median and the last response (highest value). If all three numbers are the same, it suggests little variation between participants in the responses to a particular question.

In addition, some students (n=34) also proposed measures for improvement for following years, as they found that the time allowed for some OSCE stations in the small animal section was too short. This information was considered to be of the highest value, so that the OSCE stations were reassessed and those identified as potentially requiring more time from students than what was initially allowed were either reformulated or divided into two stations and considered as linked stations. Surprisingly, they also commented that although they found the proportion (50/50) between the series of OSCEs (hands-on assessment) and the final multiple-choice questions test (assessment of factual knowledge/knowledge recall, understanding, application, and interpretation) to be correct, a minimum score in each part should be required in order to sum both marks, as otherwise one student could pass the subject just by obtaining the highest score in one of the two parts. As a result of this feedback provided anonymously by the students, for the upcoming years the minimum requirement will be to obtain at least 40% of the maximum score of each assessment (OSCEs and final exam) in order to sum both marks.

As it is nearly impossible to have a perfect assessment method, some criticisms of OSCE have also been made. Therefore, it is also important to find a balance between the resources required (both in monetary and staff terms) and the quality of the method (regarding not only validity and reliability but also practicability) (Barman, 2005). When used as a final summative assessment, the OSCE is criticized for fragmentation of skills, as it is important that the candidate show competence in carrying out a complete history taking and physical examination, with other evaluation instruments such as Clinical Evaluation Exercise (CEX) or mini-CEX (Norcini *et al.*, 2003) being available for these purposes. However, when used for continuous assessment, as presented in this report, the possible fragmentation of skills is of less importance, as it is first intended that the student acquire these skills in order to integrate them afterwards, so that the learner can perform the complete physical examination. Another concern about setting up OSCEs is the cost of organizing them. Although the cost-effectiveness of OSCEs is high given the information they provide (Davis *et al.*, 2006), when used as a continuous assessment method the costs are considerably reduced, because (i) the number of stations is small and consequently (ii) there is no need for extra examiners as the usual number of academic staff devoted to the subject could be enough. In addition, (iii) the same facilities as for the practical sessions are employed and (iv) the simulated patients for the exam will be used for the following teaching session. Therefore, the costs only relate to the examiners' time and the effort involved in organizing the OSCEs.

As a result of our experience with this assessment method during the last two years, we can ascertain its benefits and impact on students' learning behavior. However, the implementation of OSCEs required not only an effort in setting up the stations and rating scales/checklists, but also a thorough consciousness-raising process, since this method entails a mind-changing process for untrained personnel in this kind of methodology, as the examiner should act in a purely observational role, ticking a checklist but not asking questions in the traditional sense. Therefore the offering of courses related to clinical skills assessments by institutions within their teaching training and innovation programs is warranted.

Conclusions

OSCEs can be used as a tool for continuous assessment of clinical skills acquisition in veterinary medicine as students display a positive attitude to them, and they prefer this method over other more traditional approaches, despite it being really time-consuming.

Furthermore, students show a proactive attitude when asked to opine about the assessment method they have undergone, which can help examiners to improve it, since they can point out issues that could have gone unnoticed by the faculty.

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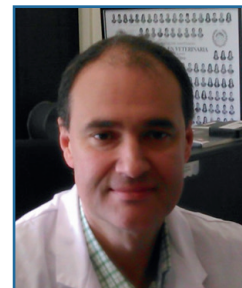
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